

ADMINISTRATIVE ORDER

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I. INTRODUCTION AND JURISDICTION

1. This Order directs C&D Technologies, Inc., Johnson Controls, Inc., and Honeywell International, Inc. (f/k/a Allied Signal, Inc.) (the "Respondents") to perform work in accordance with this Order and all attachments that are necessary to complete the remedial design of the Selected Remedy for groundwater described in the Operable Unit 1 Record of Decision for the NL Industries Superfund Site ("Site") located in Pedricktown, Salem County, New Jersey. This Order is issued to the Respondents by EPA pursuant to the authority vested in the President of the United States by Section 106(a) of CERCLA, as amended, 42 U.S.C. § 9606(a). This authority was delegated to the Administrator of EPA by Executive Order 12580, dated January 23, 1987, and was redelegated to EPA Regional Administrators on September 13, 1987 by EPA Delegation No. 14-14-B. This authority was further redelegated on November 23, 2004, by the Regional Administrator of EPA, Region 2 to the Director of the Emergency and Remedial Response Division by EPA Region 2 Delegation R-1200.

II. FINDINGS OF FACT

2. The Site encompasses approximately 44 acres, located at Pennsgrove-Pedricktown Road in Pedricktown, Salem County, New Jersey, including the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action depicted generally on the map attached as Appendix C.

3. Between 1972 and 1984, NL Industries, Inc. and subsequently National Smelting of New Jersey (NSNJ), operated both a secondary lead smelting and a lead-acid battery reclamation businesses at the Site.

4. As a result of these operations, soil at the Site was contaminated with metals. Elevated levels of lead, copper and zinc were also detected in the stream sediment and surface water. Groundwater contamination detected at the Site consisted primarily of lead and cadmium, with localized areas of elevated levels of volatile organic compounds.

5. The Site was listed on the National Priorities List in 1983 and a remedial investigation and feasibility study were conducted between 1986 and 1993.

6. EPA divided the Site into two Operable Units ("OUs") to facilitate remedial activities.

7. On September 27, 1991, the ROD for OU2 was issued by EPA and addressed slag and lead oxide piles, contaminated surfaces and debris, and contaminated standing water. OU2 activities were initiated in 1992 and were completed in 1995.

8. On July 8, 1994, the Record of Decision for OU1 ("OU1 ROD") was issued by EPA and addressed the remediation of soil, groundwater, surface water, and stream sediment. OU1 activities for the soil and stream sediment were initiated in January 2000 and are still ongoing. For groundwater, the remedy selected in the OU1 ROD was pump and treat and institutional controls.

9. On June 10, 1996, EPA and a group of respondents, including Respondents, entered into an Administrative Order on Consent, to perform the remedial design for the OU1 remedy selected in the OU1 ROD.

10. On April 1, 1999, a Consent Decree was entered by the United States District Court for the District Court of New Jersey. The consent decree provided that a group of defendants, including Respondents, perform the remedial action for the OU1 remedy selected in the OU1 ROD.

11. Due to source removal and natural attenuation processes, there was a decrease in contaminant concentrations for the groundwater at the Site.

12. Subsequent to the issuance of the consent decree, additional groundwater studies were performed by the Respondents, with EPA oversight. Based on these studies and the development of a focused feasibility study by Respondents, EPA determined that it was appropriate to amend the remedy selected in the OU1 ROD for groundwater. The selected remedy for soil and sediment was not modified.

13. On September 13, 2011, EPA issued an amendment to the ROD ("OU1 ROD Amendment"). See, Appendix A. The OU1 ROD Amendment describes the changes in the remedy for groundwater. The OU1 ROD Amendment describes the Selected Remedy for groundwater and provides that the groundwater remedy described in the OU1 ROD is retained as a contingency groundwater remedy.

14. The major components of the Selected Remedy in the OU1 ROD Amendment include in-situ pH adjustment and reagent injection for the contaminated unconfined aquifer via injection wells; monitoring of groundwater; and implementation of institutional controls to restrict the use of contaminated groundwater until cleanup goals are achieved.

15. This Order addresses the design of the Selected Remedy described in the OU1 ROD Amendment.

16. Respondents have continued to demonstrate good faith in working cooperatively with EPA to address the remaining response activities at the Site.

III. CONCLUSIONS OF LAW AND DETERMINATIONS

17. The Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

18. Each Respondent is a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. § 9601(21).

19. Each Respondent is a responsible party under one or more subsections of Section 107 (a) of CERCLA, 42 U.S.C. § 9607(a), for conditions at the Site and is subject to this Order under Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

20. Many of the substances found in the soil and groundwater at the Site are “hazardous substances” within the meaning of that term as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

21. The presence of hazardous substances at the Site or the past, present or potential migration of hazardous substances currently located at or emanating from the Site, constitute actual and/or threatened “releases” as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

22. The potential for further migration of hazardous substances from the Site poses a “ . . . threatened release of a hazardous substance from a facility” as that phrase is used in Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

23. The contamination and endangerment at this Site constitute an indivisible injury. EPA has determined that the release or threatened release of hazardous substances from the Site may present a threat to public health or welfare or the environment within the meaning of Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

IV. NOTICE TO THE STATE

24. Notice of this Order has been given to the New Jersey Department of Environmental Protection.

V. ORDER

25. Based on the foregoing, Respondents are hereby ordered to comply with the following provisions, including but not limited to, all attachments, documents, schedules and deadlines in this Order, attached to this Order, or incorporated by reference into this Order.

VI. DEFINITIONS

26. Unless otherwise expressly provided herein, terms used in this Order which are defined in CERCLA or in regulations promulgated under CERCLA shall have the meanings assigned to them in the statute or its implementing regulations. Whenever terms listed below are used in this Order or in the documents attached to this Order or incorporated by reference into this Order, the following definitions shall apply:

a. “CERCLA” shall mean the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. § 9601 et seq.

b. “Day” shall mean a calendar day.

c. “EPA” shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

d. “Hazardous Substance” shall mean any substance that falls within the

definition of a "hazardous substance" as that term is defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), and shall also mean any mixture(s) containing any such hazardous substance(s) at any concentration.

e. "NCP" shall mean the National Oil and Hazardous Substances Pollution Contingency Plan promulgated by EPA pursuant to Section 105 of CERCLA, 42 U.S.C. § 9605, at 40 C.F.R. Part 300, and all amendments or modifications thereto.

f. "NJDEP" shall mean the New Jersey Department of Environmental Protection or any successor departments or agencies of the State.

g. "OU1 ROD" shall mean the Record of Decision signed on July 8, 1994 by the Regional Administrator, EPA Region 2, and all attachments thereto. The OU 1 ROD addressed the remediation of soil, groundwater, surface water, and stream sediment.

h. "OU1 ROD Amendment" shall mean the Record of Decision Amendment signed on September 13, 2011 by the Director of the Emergency and Remedial Response Division, EPA Region 2, and all attachments thereto. The Amendment is incorporated into this Order and is an enforceable part of this Order. The OU1 ROD Amendment is attached to this Order as "Appendix A."

i. "Paragraph" shall mean a portion of this Order identified by an arable numeral.

j. "Performance Standards" shall mean the cleanup goals as set forth in the OU1 ROD Amendment and other measures of achievement of the goals of the Remedial Action selected in the OU1 ROD Amendment.

k. "Project Coordinator" shall mean the person designated by the Respondents who will be charged with the duty of being at all times knowledgeable of the performance of all Work performed pursuant to this Order.

l. "Remedial Action" or "RA" shall mean the Selected Remedy in the OU1 Rod Amendment.

m. "Remedial Design" or "RD" shall mean the remedial design for the OU1 for the Selected Remedy as set forth in the OU1 Rod Amendment and as specified in the SOW.

n. "Remedial Design Work Plan" or "RD Work Plan" shall mean the work plan to design the Selected Remedy as set forth in OU1 ROD Amendment and as specified in the SOW.

o. "Remedial Project Manager" shall mean the person designated by the EPA who will be charged with the duty of being at all times knowledgeable of the performance of all Work performed pursuant to this Order.

p. "Respondents" shall mean C&D Technologies, Inc., Johnson Controls, Inc., and Honeywell International, Inc. (f/k/a Allied Signal, Inc.) and includes their officers, employees, agents, subsidiaries, assigns and successors.

q. "Section" shall mean a portion of this Order identified by a Roman numeral and includes one or more Paragraphs.

r. "Selected Remedy" is the remedy selected in the OUI ROD.

s. "Site" shall mean the NL Industries Superfund Site encompasses approximately 44 acres, located at Pennsgrove-Pedricktown Road in Pedricktown, Salem County, New Jersey, including the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action. A Site map is attached to this Order as "Appendix C."

t. "Statement of Work" or "SOW" shall mean the statement of work for implementation of the Remedial Design at the Site as set forth in "Appendix B."

u. "State" shall mean the State of New Jersey.

v. "United States" shall mean the United States of America, including but not limited to, the United States Environmental Protection Agency.

w. "Waste Material" shall mean any substance which meets the definition of any one or more of the following:

- (1) a "hazardous substance" as that term is defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14); or
- (2) a "pollutant or contaminant" as those terms are defined in Section 101(33) of CERCLA, 42 U.S.C. § 9601(33); or
- (3) any solid waste under Section 1004 (27) of the federal Resource Conservation & Recovery Act ("RCRA"), 42 U.S.C. § 6903(27); or
- (4) any mixture containing any of the constituents noted in (1), (2), or (3), above.

x. "Work" shall mean all work and other activities that Respondents are required to perform under this Order, including, but not limited to, tasks described in the SOW and any activities required to be undertaken pursuant to this Order.

VII. NOTICE OF INTENT TO COMPLY

27. Respondents shall provide, not later than seven (7) days after the effective date of this Order, written notice to EPA's Remedial Project Manager ("RPM") and Assistant Regional Counsel for the Site at the address specified in Section XVI, stating whether Respondents will comply with the terms of this Order. If any Respondent does not unequivocally commit to perform or finance the Work as provided by this Order, it shall be deemed to have violated this Order and to have failed or refused to comply with this Order. If applicable, Respondents' written notice shall describe, using facts that exist on or prior to the effective date of this Order, any "sufficient cause" defenses asserted by Respondents under Sections 106(b) and 107(c)(3) of CERCLA. The absence of a response by EPA to the notice required by this Paragraph shall not be deemed to be acceptance of Respondents' assertions.

VIII. PARTIES BOUND

28. This Order shall apply to and be binding upon each Respondent, its principals, officers, employees, agents, directors, subsidiaries, assigns and successors. Each Respondent is responsible for completing the Work and all applicable requirements of this Order. No change in the ownership, corporate status, or other control of each Respondent shall alter any of its responsibilities under this Order.

29. Respondents shall provide a copy of this Order to any prospective owners or successors before a controlling interest in Respondents' assets, property rights, or stock are transferred to the prospective owner or successor. Respondents shall provide a copy of this Order to each contractor, subcontractor, laboratory, or consultant retained to perform any Work under this Order, within five days after the effective date of this Order or on the date such services are retained, whichever date occurs later. Respondents shall also provide a copy of this Order to each person representing Respondents with respect to the Site or the Work and shall condition all contracts and subcontracts entered into hereunder upon performance of the Work in conformity with the terms of this Order. With regard to the activities undertaken pursuant to this Order, each contractor and subcontractor shall be deemed to be related by contract to the Respondents within the meaning of Section 107(b)(3) of CERCLA, 42 U.S.C. § 9607(b)(3). Notwithstanding the terms of any contract, Respondents are responsible for compliance with this Order and for ensuring that their contractors, subcontractors and agents comply with this Order, and perform any Work in accordance with this Order.

IX. DESIGNATED PROJECT MANAGER AND COORDINATORS

30. All aspects of the Work to be performed by the Respondents pursuant to this Order shall meet all requirements of applicable federal, state and local laws and be performed under the direction and supervision of a Supervising Contractor. The Supervising Contractor shall be a qualified licensed professional engineering firm. All plans and specifications shall be prepared under the supervision of, and signed/certified by, a licensed New Jersey professional engineer. Respondents shall retain one or more contractor(s) to perform the Work and shall notify EPA of the name(s) and qualifications of such contractor(s) within ten (10) days of the Effective Date. Respondents shall also notify EPA of the name(s) and qualification(s) of any other contractor(s)

or subcontractor(s) retained to perform the Work at least ten (10) days prior to commencement of such Work. EPA retains the right to disapprove of any or all of the contractors and/or subcontractors retained by Respondents. If EPA disapproves of a selected contractor, Respondents shall retain a different contractor and shall notify EPA of that contractor's name and qualifications within thirty (30) days of EPA's disapproval. With respect any contractor proposed to be Supervising Contractor, Respondents shall demonstrate that the proposed contractor has a quality system that complies with the Uniform Federal Policy for Implementing Quality Systems (UFP-QS), (EPA/505/F-03/001, March 2005), by submitting a copy of the proposed contractor's Quality Management Plan (QMP). EPA will provide written notice if it disapproves of the proposed Supervising Contractor and request that the Respondents propose another Supervising Contractor. Respondents shall notify EPA of the name of the next proposed Supervising Contractor within thirty (30) days of EPA's request. If at any time thereafter, Respondents propose to change a Supervising Contractor, Respondents shall give such notice to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under the Administrative Order.

31. Within ten (10) days after the Effective Date, Respondents shall designate a Project Coordinator, and alternate Project Coordinator, who may be employees of the Supervising Contractor who shall be responsible for the day-to-day management of all Work to be performed pursuant to this Order and shall submit to EPA the designated Project Coordinator's name, address, telephone number, and qualifications. The Project Coordinator shall not be an attorney. The Project Coordinator shall have adequate technical and managerial experience to manage all Work described in this SOW and under this Order. The Project Coordinator shall be knowledgeable at all times about all Work. The Project Coordinator shall be the primary contact for EPA on all matters relating to the Work at the Site and should be available for EPA to contact during all working days. EPA retains the right to disapprove of the designated Project Coordinator. If EPA disapproves of the designated Project Coordinator, Respondents shall retain a different Project Coordinator and shall notify EPA of that person's name, address, telephone number and qualifications within 14 days following EPA's disapproval. Receipt by Respondents' Coordinator of any notice or communication from EPA relating to this Order shall constitute receipt by all Respondents.

X. WORK TO BE PERFORMED

32. The Work to be performed consists of all Remedial Design activities required in the OUI ROD Amendment and the SOW. Respondents shall perform all action necessary to implement the SOW. The Work performed by Respondents pursuant to this Order shall, at a minimum, be designed to achieve the Performance Standards specified in the OUI ROD Amendment. Notwithstanding any action by EPA, Respondents remain fully responsible for achievement of the Performance Standards in the OUI ROD Amendment. Nothing in this Order, or in EPA's approval of any submission, shall be deemed to constitute a warranty or representation of any kind by EPA that full performance of the SOW will result in the design of a Remedial Action that will achieve the Performance Standards set forth in the OUI ROD Amendment. Respondents' compliance with such approved documents does not foreclose EPA from seeking additional work to achieve the applicable Performance Standards.

The RD activities to be performed in support of the implementation of the Work include, but are not limited to, the following:

- A. Development of work plans, tasks, and schedules for: Pre-RD Investigations, including a Pilot Study; Preliminary RD Report (35% completion) which shall include the findings of the Pre-RD investigations and pilot study; Pre-Final RD Report (95% completion); and a Final RD Report (100% completion) (collectively, RD Reports);
- B. Performance of data collection, including groundwater sampling and analysis necessary to design the pH adjustment and reagent injection system, and evaluate the current extent of groundwater contamination;
- C. Performance of a pilot study for the implementation of the groundwater Selected Remedy;
- D. Design of a network of wells and prepare detailed specifications for the implementation of the groundwater Selected Remedy as outlined in the OUI ROD Amendment;
- E. Evaluation of the need for air monitoring during construction activities at the Site and development, if necessary, of plans to ensure that air emissions resulting from construction activities meet applicable or relevant and appropriate air emission requirements;
- F. Tasks required for establishing institutional controls, such as the implementation of a Classification Exemption Area (CEA) to restrict the use of groundwater until the appropriate groundwater cleanup standards are achieved;
- G. Tasks to conduct an analysis to ensure that any adverse impacts caused by the RA to the streams, surface water bodies and wetland areas will be mitigated; and
- H. Tasks to identify how the RD and the RA will be implemented using the principles specified in EPA Region 2's Clean and Green Policy.

33. Work Plan and Implementation.

a. Within sixty (60) days after EPA's approval of the Supervisory Contractor, Respondents shall submit to EPA a work plan for the design of the Remedial Action at the Site ("Remedial Design Work Plan" or "RD Work Plan") for EPA review and approval. The draft RD Work Plan shall be prepared in accordance with the OUI ROD Amendment, this SOW, this Order, CERCLA and relevant EPA guidance, including EPA document entitled Guidance on Oversight of Remedial Designs and Remedial Actions performed by Potentially Responsible Parties, (OSWER directive 9355.5-01, EPA/540/g-90-001), dated April 1990, and shall be in conformance, inter alia, with the Superfund Remedial Design and Remedial Action Guidance, dated June 1986, and any updates thereto. The RD Work Plan shall provide for design of the

Selected Remedy set forth in the OUI ROD Amendment, in accordance with the SOW and for achievement of the Performance Standards and other requirements set forth in the OUI ROD Amendment, this Order, and/or the SOW. Upon its approval by EPA, the Remedial Design Work Plan shall be incorporated into and become enforceable under this Order.

b. The draft RD Work Plan shall include tasks, work plans, field work and data collection, and schedules for implementation of the RD, that are necessary to ensure compliance with performance standards, ARARs, or other requirements of the remedy selected in the OUI ROD Amendment, including the preparation and submission of a Preliminary RD Report (35% completion) which shall include the findings of the Pre-RD Investigations and the pilot study); a Pre-Final RD Report (95% completion); and a Final RD Report (100% completion) (collectively, RD Reports). The draft Remedial Design Work Plan shall also include a draft schedule for remedial action, O&M, and monitoring activities. The schedule shall be in the form of a task/subtask activity bar chart or critical path method sequence of events. The RD Work Plan shall also include a description of how the RD will incorporate the principles found in EPA Region 2's Clean and Green Policy. At a minimum, the draft Remedial Design Work Plan shall include, but not be limited to, the following:

- A. A description of all RD Tasks.
- B. A detailed schedule for all RD activities.
- C. A Field Sampling and Analysis Plan (FSP) which provides for the collection of all data and work necessary to complete RD field activities.
- D. A Pilot Study Work Plan.
- E. A plan for establishing institutional controls, such as the implementation of a CEA to restrict the use of groundwater impacted by the Site until the appropriate groundwater cleanup standards are achieved.
- F. A plan for the performance of air monitoring, as necessary, during construction activities at the Site.
- G. A description of how the RD will incorporate the principles found in EPA Region 2's Clean and Green Policy, found at http://epa.gov/region2/superfund/green_remediation/.
- H. Quality Assurance/Quality Control Project Plan (QAPP).
- I. Health and Safety Plan

The Health and Safety Plan ("HASP") for all activities performed under this Order shall be developed by Respondents to address the protection of public health and safety and the response to contingencies that could impact public health, safety, and the environment. The HASP shall satisfy the requirements of

the Occupational Safety and Health Guidance for Hazardous Waste Site Activities, (June 1990, DHHS NIOSH Publication No. 90-117), and the Occupational Safety and Health Administration, U.S. Department of Labor ("OSHA") requirements cited below:

All activities performed by or on behalf of Respondents shall be performed in such a manner as to ensure the safety and health of personnel so engaged. Activities shall be conducted in accordance with all pertinent general industry (29 CFR Part 1910) and construction (29 CFR Part 1926) OSHA standards, and EPA's Standards Operating Safety Guides (OSWER, 1988), as well as any other applicable State and municipal codes or ordinances. All RD/RA/O&M activities performed by Respondents, their contractors or subcontractors, shall comply with those requirements set forth in OSHA's final rule entitled Hazardous Waste Operations and Emergency Response, 29 CFR Part 1910.120, Subpart H.

- J. A plan to ensure that any adverse impacts caused by the Work to streams, surface water bodies and wetland areas will be mitigated.

K. Access and Other Approvals

The draft RD Work Plan shall include descriptions of known access and other approvals and institutional controls which Respondents will need in order to comply with this Order, with the exception of those approvals needed from EPA. This description shall be updated as appropriate, if subsequent approvals are required.

c. Upon approval of the RD Work Plan by EPA, and after a reasonable opportunity for review and comment by the State, and submittal of the Health and Safety Plan for all field activities to EPA and the State, Respondents shall implement the RD Work Plan. Respondents shall submit to EPA and the State all plans, submittals, and other deliverables required under the approved RD Work Plan in accordance with the approved schedule for review. Unless otherwise directed by EPA, Respondents shall not commence further Remedial Design activities at the Site prior to approval of the Remedial Design Work Plan.

d. In accordance with the schedule set forth in the EPA-approved RD Work Plan, the Respondents shall submit the findings of the Pre-RD Investigations within the Preliminary RD Report. This will include the results and analysis of all data collected during the Pre-RD field studies, as well as the significant findings and recommendations of the Pilot Study. The preliminary design submittal shall include, at a minimum, the following: (1) design criteria; (2) results of pilot studies; (3) results of additional field sampling and pre-design work; (4) project delivery strategy; (5) preliminary plans, drawings, and sketches; (6) required specifications in outline form; and (7) a preliminary construction schedule.

e. The pre-final/final design submittal shall include, at a minimum, the following: (1) final plans and specifications; (2) Operation and Maintenance Plan; (3)

Construction Quality Assurance Project Plan ("CQAPP"); and (4) RA schedule. The CQAPP which shall detail the approach to quality assurance during construction activities at the Site, shall specify a quality assurance official ("QA Official"), independent of the Project Coordinator, to conduct a quality assurance program during the construction phase of the project.

34. Respondents shall conduct all work in accordance with the SOW, the OUI ROD Amendment, CERCLA, the NCP, and all applicable EPA guidance. The Project Coordinator shall use his or her best efforts to inform Respondents if new or revised guidances may apply to the Work.

35. Respondents shall perform the tasks and submit the deliverables that the SOW sets forth. EPA will review and comment on the Preliminary RD Report (35% completion), and the Pre-Final RD Report (95% completion). Respondents shall address EPA's comments on each RD Report in the subsequent RD Report (e.g. changes required by comments on the Preliminary RD Report (35% completion) shall be made in the Pre-Final RD Report (95% completion).

36. Upon EPA's approval, this Order incorporates any reports, plans, specifications, schedules, and attachments that this Order or the SOW requires.

37. If any unanticipated or changed circumstances exist at the Site that may significantly affect the Work or schedule, Respondents shall notify the EPA Project Coordinator by telephone within 24 hours of discovery of such circumstances.

38. If EPA determines that additional tasks, including, but not limited to, additional investigatory work or engineering evaluation, are necessary to complete the Work, EPA shall notify Respondents in writing. Respondents shall submit a workplan to EPA for the completion of such additional tasks within 30 days of receipt of such notice, or such longer time as EPA agrees. The workplan shall be completed in accordance with the same standards, specifications, and requirements of other deliverables pursuant to this Order. EPA will review and comment on, as well as approve, approve with conditions, modify, or disapprove the workplan pursuant. Upon approval or approval with modifications of the workplan, Respondents shall implement the additional work in accordance with the schedule of the approved workplan. If, at any time during the Remedial Design process, Respondents become aware of the need for additional data beyond the scope of the approved Work Plans, Respondents shall have an affirmative obligation to submit to EPA's Project Coordinator, within 20 days, a memorandum documenting the need for additional data.

39. Upon request by EPA, Respondents shall allow EPA or its authorized representatives to take split and/or duplicate samples. Respondents shall notify EPA not less than 21 days in advance of any sample collection activity, unless shorter notice is agreed to by EPA. EPA shall have the right to take any additional samples that EPA deems necessary.

40. Community Relations Plan. EPA will prepare a community relations plan, in accordance with EPA guidance and the NCP. As requested by EPA, Respondents shall provide information supporting EPA's community relations plan and shall participate in the preparation

of such information for dissemination to the public and in public meetings that may be held or sponsored by EPA to explain activities at, or concerning, the Site.

XI. ADDITIONAL RESPONSE ACTIVITIES

41. EPA may determine that in addition to the Work identified in this Order and attachments to this Order, additional response activities may be necessary to protect human health and the environment including meeting Performance Standards. If EPA determines that additional response activities are necessary, EPA may require Respondents to submit a work plan for additional response activities. EPA may also require Respondents to modify any plan, or other deliverable required by this Order, including any approved modifications.

42. Not later than 30 days after receiving EPA's notice that additional response activities are required pursuant to this Section and request for a work plan, Respondents shall submit a work plan for the response activities to EPA for review and approval. Upon written approval by EPA, the work plan is incorporated into this Order as a requirement of this Order and shall be an enforceable part of this Order. Upon approval of the work plan by EPA, Respondents shall implement the work plan according to the standards, specifications, and schedule in the approved work plan. Respondents shall notify EPA of its intent to perform such additional response activities within 7 days after receipt of EPA's notification of the need for additional response activities.

43. Any additional response activities that Respondents determines are necessary to protect human health and the environment shall be subject to written approval by EPA. If such additional response activities are authorized by EPA, then Respondents shall complete such response activities in accordance with plans, specifications, and schedules approved by EPA pursuant to this Order.

XII. ENDANGERMENT AND EMERGENCY RESPONSE

44. In the event of any action or occurrence during the performance of the Work which causes or threatens to cause a release of a hazardous substance or which may present an immediate threat to public health or welfare or the environment, Respondents shall immediately take all appropriate action to prevent, abate or minimize the threat, and shall immediately notify EPA's Remedial Project Manager. In the event of the Remedial Project Manager's unavailability, the Respondents shall notify the Chief of the EPA New Jersey Remediation Branch at (212) 637- 4288, or if such person or such person's delatee is unavailable, the EPA Regional Emergency 24-hour telephone number at (732) 548-8730. Respondents shall take such action in accordance with all applicable provisions of this Order, including but not limited to the Health and Safety Contingency Plan and any other documents developed pursuant to the Remedial Action Work Plan. In addition, in the event of any release of a hazardous substance from the Site, Respondents shall immediately notify the RPM or its delatee and the National Response Center at (800) 424-8802. Respondents shall submit a written report to EPA within 7 days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, and not in lieu of,

reporting under Section 103(c) of CERCLA, 42 U.S.C. § 9603(c), and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004, *et seq.*

45. In addition, in the event of any release of a hazardous substance from the Site, Respondents shall immediately notify the EPA Project Coordinator, the Chief of the Northern New Jersey Remediation Section of the Emergency and Remedial Response Division of EPA Region II by telephone (212)-637-4380 and the National Response Center at (800)424-8802. Respondents shall submit a written report to EPA within 7 days after each release, setting forth the events that occurred and the measures taken, or to be taken, to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, and not in lieu of, reporting under Section 103(c) of CERCLA, 42 U.S.C. § 9603(c), and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. § 11004, *et seq.*

46. Nothing in the preceding Paragraph or elsewhere in this Order shall be deemed to limit any authority of the United States to take, direct or order all appropriate action to protect human health and the environment or to prevent, abate or minimize an actual or threatened release of hazardous substances on, at or from the Site.

XIII. EPA REVIEW OF SUBMISSIONS

47. After review of any deliverable, plan, report or other item which is required to be submitted for review and approval pursuant to this Order, EPA may: (a) approve, in whole or in part, the submission; (b) approve the submission upon specified conditions; (c) modify the submission to cure the deficiencies; (d) disapprove, in whole or in part, the submission, directing that Respondents modify the submission; (e) any combination of the above; or (f) disapprove the submission and assume responsibility for performing all or any part of the response action.

48. In the event of approval, approval upon conditions, or modification by EPA, pursuant to Subparagraph 50(a), (b), (c), or (e), Respondents shall proceed to take any action required by the plan, report, or other deliverable, as approved or modified by EPA. Following EPA approval or modification of a submission or portion thereof, Respondents shall not thereafter alter or amend such submission or portion thereof unless directed by EPA.

49. Upon receipt of a notice of disapproval, Respondents shall, within 14 days or such longer time as specified by EPA in such notice, correct the deficiencies and resubmit the plan, report, or other deliverable for approval. Notwithstanding the receipt of a notice of disapproval, Respondents shall proceed to take any action required by any non-deficient portion of the submission, unless otherwise directed by EPA.

50. Respondents shall not proceed further with any subsequent activities or tasks until receiving EPA approval, approval on condition, or modification of the RD Work Plan. While awaiting EPA approval, approval on condition, or modification of this deliverable, Respondents shall proceed with all other tasks and activities that may be conducted independently of this deliverable, in accordance with the schedule set forth in this Order.

51. For all remaining deliverables not listed above in Subparagraph 52, Respondents shall proceed with all subsequent tasks, activities, and deliverables without awaiting EPA approval on the submitted deliverable. EPA reserves the right to stop Respondents from proceeding further, either temporarily or permanently, on any task, activity, or deliverable at any point during the RD.

52. If upon the first resubmission or upon any subsequent resubmission, the plan, report or other deliverable is disapproved by EPA, Respondents shall be deemed to be out of compliance with this Order. In the event that a resubmitted plan, report or other deliverable, or portion thereof, is disapproved by EPA, EPA may again require Respondents to correct the deficiencies, in accordance with the preceding Paragraphs of this Section. In addition, or in the alternative, EPA retains the right to amend or develop the plan, report or other deliverable. Respondents shall implement any such plan, report, or deliverable as corrected, modified, or developed by EPA. In the event that EPA takes over some of the tasks, Respondents shall incorporate and integrate information supplied by EPA into the final reports.

53. All plans, reports, and other submittals required to be submitted to EPA under this Order shall, upon approval by EPA, be deemed to be incorporated in and an enforceable part of this Order. In the event EPA approves a portion of a plan, report, or other item required to be submitted to EPA under this Order, the approved portion shall be deemed to be incorporated in and an enforceable part of this Order.

54. Respondents may request in writing that EPA approve modifications to EPA-approved reports, schedules, deliverables and other writings required under the terms of this Order at any time during the implementation of the Work required by this Order. Any and all such modifications under this Order must be approved in writing and signed by the Chief of the New Jersey Remediation Branch, Emergency and Remedial Response Division, EPA-Region 2.

a. EPA shall have the sole authority to make any such modifications under this Order

b. EPA shall be the final arbiter in any dispute regarding the sufficiency or acceptability of all documents submitted and all activities performed pursuant to this Order. EPA may modify those documents and/or perform or require the performance of additional work unilaterally. EPA also may require Respondents to perform additional work unilaterally to accomplish the objectives set forth in this Order.

XIV. PROGRESS REPORTS

55. In addition to the other deliverables set forth in this Order, Respondents shall submit a written progress report to EPA concerning actions undertaken pursuant to this Order every fifteenth (15) day of each month following the Effective Date until termination of this Order, unless otherwise directed in writing by the Project Coordinator. These reports shall describe all significant developments during the preceding period, including the actions performed and any problems encountered, analytical data received during the reporting period, estimate of the percentage work completed and the developments anticipated during the next reporting period

including any anticipated delays and all efforts made by Respondents to mitigate delays.

XV. COMPLIANCE WITH APPLICABLE LAWS

56. All activities carried out by Respondents pursuant to this Order shall be performed in accordance with the requirements of all federal and state laws and regulations. EPA has determined that the activities contemplated by this Order are consistent with the NCP.

57. Except as provided in Section 121(e) of CERCLA and the NCP, no permit shall be required for any portion of the Work conducted entirely on-Site. Where any portion of the Work requires a federal or state permit or approval, Respondents shall submit timely applications and take all other actions necessary to obtain and to comply with all such permits or approvals.

58. This Order is not, and shall not be construed to be, a permit issued pursuant to any federal or state statute or regulation.

XVI. REMEDIAL PROJECT MANAGER

59. All communications, whether written or oral, from Respondents to EPA shall be directed to EPA's Remedial Project Manager. Respondents shall submit to EPA and NJDEP copies of all documents, including plans, reports, and other correspondence, which are developed pursuant to this Order, and shall send these documents by certified mail or overnight mail to the following addresses:

2 Copies to: 1 hard copy and 1 electronic

Chief, New Jersey Remediation Branch
Emergency and Remedial Response Division
U.S. Environmental Protection Agency
290 Broadway, 19th Floor
New York, New York 10007-1866
Attn: NL Industries Superfund Site Remedial Project Manager

1 Electronic Copy to:

New Jersey Superfund Branch
Office of Regional Counsel
U.S. Environmental Protection Agency
290 Broadway, 17th Floor
New York, New York 10007-1866
Attn: Site Attorney, NL Industries Superfund Site

60. In the event that EPA requests more than the number of copies stated above of any report or other documents required by this Order for itself or the State, Respondents shall provide the number of copies requested.

61. EPA has the unreviewable right to change its Remedial Project Manager. If EPA changes its Remedial Project Manager, EPA will inform Respondents in writing of the name, address, and telephone number of the new Remedial Project Manager.

62. EPA's RPM shall have the authority lawfully vested in a RPM by the National Contingency Plan, 40 C.F.R. Part 300. EPA's RPM shall have authority, consistent with the National Contingency Plan, to halt any work required by this Order, and to take any necessary response action.

63. EPA shall arrange for a qualified person to assist in its oversight and review of the conduct of the Remedial Design, as required by Section 104(a) of CERCLA, 42 U.S.C. Section 9604(a). Such person shall have the authority to observe Work and make inquiries in the absence of EPA.

XVII. ACCESS TO SITE NOT OWNED BY RESPONDENTS

64. If the Site, the off-Site area that is to be used for access, property where documents required to be prepared or maintained by this Order are located, or other property subject to or affected by the clean up, is owned in whole or in part by parties other than those bound by this Order, Respondents will obtain, or use their best efforts to obtain, site access agreements from the present owners within 60 days of the effective date of this Order. Such agreements shall provide access for EPA, its contractors and oversight officials, the State and its contractors, and Respondents and Respondents' authorized representatives and contractors, and such agreements shall specify that Respondents is not EPA's representatives with respect to liability associated with the activities to be undertaken. Copies of such agreements shall be provided to EPA prior to Respondents' initiation of field activities. Respondents' best efforts shall include providing reasonable compensation to any property owner. If access agreements are not obtained within the time referenced above, Respondents shall immediately notify EPA of their failure to obtain access. Subject to the United States' non-reviewable discretion, EPA may use its legal authorities to obtain access for Respondents, may perform those response actions with EPA contractors at the property in question, or may terminate the Order if Respondents cannot obtain access agreements. If EPA performs those tasks or activities with contractors and does not terminate the Order, Respondents shall perform all other activities not requiring access to that property. Respondents shall integrate the results of any such tasks undertaken by EPA into its reports and deliverables.

XVIII. SITE ACCESS AND DATA/DOCUMENT AVAILABILITY

65. Respondents shall allow EPA and its authorized representatives and contractors to enter and freely move about all property at the Site and off-Site areas subject to or affected by the work under this Order or where documents required to be prepared or maintained by this Order are located, for the purposes of inspecting conditions, activities, the results of activities, records, operating logs, and contracts related to the Site or Respondents and their representatives or contractors pursuant to this Order; reviewing the progress of the Respondents in carrying out the terms of this Order; conducting tests as EPA or its authorized representatives or contractors deem necessary; using a camera, sound recording device or other documentary type equipment;

and verifying the data submitted to EPA by Respondents. Respondents shall allow EPA and its authorized representatives to enter the Site, to inspect and copy all records, files, photographs, documents, sampling and monitoring data, and other writings related to work undertaken in carrying out this Order. Nothing herein shall be interpreted as limiting or affecting EPA's right of entry or inspection authority under federal law.

66. Respondents may assert a claim of business confidentiality covering part or all of the information submitted to EPA pursuant to the terms of this Order under 40 C.F.R. 2.203, provided such claim is not inconsistent with Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7) or other provisions of law. This claim shall be asserted in the manner described by 40 C.F.R. 2.203(b) and substantiated by Respondents at the time the claim is made. Information determined to be confidential by EPA will be given the protection specified in 40 C.F.R. Part 2. If no such claim accompanies the information when it is submitted to EPA, it may be made available to the public by EPA or the State of New Jersey without further notice to Respondents. Respondents shall not assert confidentiality claims with respect to any data related to Site conditions, sampling, or monitoring.

67. Respondents shall maintain for the period during which this Order is in effect, an index of documents that Respondents claims contain confidential business information. The index shall contain, for each document, the date, author, addressee, and subject of the document. Upon written request from EPA, Respondents shall submit a copy of the index to EPA.

68. As requested by EPA, Respondents shall participate in the preparation of such information for distribution to the public and in public meetings which may be held or sponsored by EPA to explain activities at or relating to the Site.

XIX. RECORD PRESERVATION

69. Respondents shall provide to EPA upon request, copies of all documents and information within their possession and/or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Order, including but not limited to sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information related to the Work. Respondents shall also make available to EPA for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the Work.

70. Until 10 years after EPA provides notice pursuant to Paragraph 84 of this Order, Respondents shall preserve and retain all records and documents in their possession or control, including the documents in the possession or control of their contractors and agents on and after the effective date of this Order that relate in any manner to the Site. At the conclusion of this document retention period, Respondents shall notify the United States at least 90 calendar days prior to the destruction of any such records or documents, and upon request by the United States, Respondents shall deliver any such records or documents to EPA.

71. Within 90 days after the effective date of this Order, Respondents shall submit a

written certification to EPA's Remedial Project Manager and Site Attorney that it has not altered, mutilated, discarded, destroyed or otherwise disposed of any records, documents or other information relating to their potential liability with regard to the Site since notification of potential liability by the United States or the State.

XX. DELAY IN PERFORMANCE

72. Any delay in performance of this Order that, in EPA's judgment, that is not properly justified by Respondents under the terms of this Section shall be considered a violation of this Order. Any delay in performance of this Order shall not affect Respondents' obligations to fully perform all obligations under the terms and conditions of this Order.

73. Respondents shall notify EPA of any delay or anticipated delay in performing any requirement of this Order. Such notification shall be made by telephone and electronic mail to EPA's Remedial Project Manager within 48 hours after Respondents first knew or should have known that a delay might occur. Respondents shall adopt all reasonable measures to avoid or minimize any such delay. Within 5 business days after notifying EPA by telephone and electronic mail, Respondents shall provide written notification fully describing the nature of the delay, any justification for delay, any reason why Respondents should not be held strictly accountable for failing to comply with any relevant requirements of this Order, the measures planned and taken to minimize the delay, and a schedule for implementing the measures that will be taken to mitigate the effect of the delay. Increased costs or expenses associated with implementation of the activities called for in this Order is not a justification for any delay in performance.

XXI. ASSURANCE OF ABILITY TO COMPLETE WORK

74. Respondents shall demonstrate their ability to complete the Work required by this Order and to pay all claims that arise from the performance of the Work by obtaining and presenting to EPA within 30 days after the effective date of this Order, one of the following:

a. A surety bond unconditionally guaranteeing payment and/or performance of the Work that is issued by a surety company among those listed as acceptable sureties on federal bonds as set forth in Circular 570 of the U.S. Department of the Treasury;

b. One or more irrevocable letters of credit, payable to or at the direction of EPA, that is issued by one or more financial institution(s) (i) that has the authority to issue letters of credit and (ii) whose letter-of-credit operations are regulated and examined by a federal or state agency;

c. A policy of insurance that (i) provides EPA with acceptable rights as a beneficiary thereof; and (ii) is issued by an insurance carrier (a) that has the authority to issue insurance policies in the applicable jurisdiction(s) and (b) whose insurance operations are regulated and examined by a federal or state agency;

d. A demonstration by each Respondent that it meets the financial test criteria of 40

C.F.R. § 264.143(f) with respect to the estimated cost of the Work (plus the amount(s) of any other federal or any state environmental obligations financially assured through the use of a financial test or guarantee), provided that all other requirements of 40 C.F.R. § 264.143(f) are met to EPA's satisfaction; or

e. A written guarantee to fund or perform the Work executed in favor of EPA by one or more of the following: (i) a direct or indirect parent company of each Respondent, or (ii) a company that has a "substantial business relationship" (as defined in 40 C.F.R. § 264.141(h)) with each Respondent; provided, however, that any company providing such a guarantee must demonstrate to the satisfaction of EPA that it satisfies the financial test and reporting requirements for owners and operators set forth in subparagraphs (1) through (8) of 40 C.F.R. § 264.143(f) with respect to the Estimated Cost of the Work (plus the amount(s) of any other federal or any state environmental obligations financially assured through the use of a financial test or guarantee) that it proposes to guarantee hereunder.

75. Respondents shall demonstrate financial assurance in an amount of no less than \$150,000.00 for the Work. If Respondents seek to demonstrate ability to complete the remedial action by means provided under Subsections d. or e. of the preceding Paragraph, it shall re-submit such information annually, on the anniversary of the effective date of this Order. If EPA determines that such financial information is inadequate, Respondents shall, within 30 days after receipt of EPA's notice of determination, obtain and present to EPA for approval one of the other five forms of financial assurance listed in the preceding Paragraph.

76. At least 7 days prior to commencing any work at the Site pursuant to this Order, Respondents shall submit to EPA a certification that Respondents or their contractors and subcontractors have adequate insurance coverage or have indemnification for liabilities for injuries or damages to persons or property which may result from the activities to be conducted by or on behalf of Respondents pursuant to this Order. Respondents shall ensure that such insurance or indemnification is maintained for the duration of the Work required by this Order.

77. Funding for Work Takeover. Upon the commencement of any work takeover, if (a) for any reason EPA is unable to promptly secure the resources guaranteed under any such performance guarantee(s), whether in cash or in kind; necessary to continue and complete the Work assumed by EPA under the work takeover, or (b) in the event that the performance guarantee involves a demonstration of satisfaction of the financial test criteria, Respondents shall upon written demand from EPA deposit into a special account within the EPA Hazardous Substance Superfund or such other account as EPA may specify, in immediately available funds and without setoff, counterclaim, or condition of any kind, a cash amount up to but not exceeding the estimated cost of completing the Work as of such date, as determined by EPA. In addition, if at any time EPA is notified by the issuer of a performance guarantee that such issuer intends to cancel the performance guarantee mechanism it has issued, then, unless Respondents provide a substitute performance guarantee mechanism in accordance with this Section no later than 30 days prior to the impending cancellation date, EPA shall be entitled (as of and after the date that is 30 days prior to the impending cancellation) to draw fidly on the funds guaranteed under the then-existing performance guarantee.

XXII. UNITED STATES NOT LIABLE

78. The United States and EPA, by issuance of this Order, or by issuance of any approvals pursuant to this Order, assume no liability for any injuries or damages to persons or property resulting from acts or omissions by Respondents, or their directors, officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order, or Respondents' failure to perform properly or complete the requirements of this Order. Neither the United States nor EPA may be deemed to be a party to any contract entered into by Respondents or their directors, officers, employees, agents, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order, and Respondents shall not represent to anyone that the United States or EPA is or may be a party to any such contract.

79. Respondents shall save and hold harmless the United States and its officials, agents, employees, contractors, subcontractors, or representatives from any and all claims or causes of action or other costs incurred by the United States including but not limited to attorney fees and other expenses of litigation and settlement arising from or on account of acts or omissions of Respondents, their officers, directors, employees, agents, contractors, subcontractors, and any persons acting on behalf or under their control, in carrying out activities pursuant to this Order, including any claims arising from any designation of Respondents as EPA's authorized representatives under Section 104(e) of CERCLA.

XXIII. ENFORCEMENT AND RESERVATIONS

80. EPA reserves the right to bring an action against Respondents under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any response costs incurred by the United States related to this Order and/or for any other response costs which have been incurred or will be incurred by the United States relating to the Site. This reservation shall include, but not be limited to past costs, direct costs, indirect costs, the costs of oversight, the costs of compiling the cost documentation to support oversight cost demand, as well as accrued interest as provided in Section 107(a) of CERCLA.

81. Notwithstanding any other provision of this Order, at any time during the response action, EPA may perform its own studies, complete the response action (or any portion of the response action) as provided in CERCLA and the NCP, and seek reimbursement from Respondents for their costs, or seek any other appropriate relief

82. Nothing in this Order shall preclude EPA from taking any additional enforcement actions, including modification of this Order or issuance of additional Orders, and/or additional remedial or removal actions as EPA may deem necessary, or from requiring Respondents in the future to perform additional activities pursuant to CERCLA, 42 U.S.C. § 9606(a), *et seq.*, or any other applicable law. Respondents shall be liable under CERCLA Section 107(a), 42 U.S.C. § 9607(a), for the costs of any such additional actions.

83. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection and enforcement authorities and rights under CERCLA,

RCRA, and any other applicable statutes or regulations.

84. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against any person for any liability it may have arising out of or relating in any way to the Site.

85. If a court issues an order that invalidates any provision of this Order or finds that Respondents have sufficient cause not to comply with one or more provisions of this Order, Respondents shall remain bound to comply with all provisions of this Order not invalidated by the court's order.

86. Except as specifically provided in this Order, nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Order, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring the Respondents(s) in the future to perform additional activities pursuant to CERCLA or any other applicable law. EPA reserves the right to bring an action against Respondents(s) under section 107 of CERCLA, 42 U.S.C. Section 9607, for recovery of any response costs incurred by the United States related to this Order or the Site and not reimbursed by Respondents.

87. Notwithstanding any other provision of this Order, failure of Respondents to comply with any provision of this Order may subject Respondents to civil penalties of up to thirty-seven thousand five hundred dollars (\$37,500) per violation per day, as provided in Section 106(b) (1) of CERCLA, 42 U.S.C. § 9606(b) (I), and the Debt Collection and Improvement Act of 1996 (see civil Monetary Penalty Inflation Adjustment Rule, 40 C.F.R. Part 19). Respondents also may be subject to punitive damages in an amount at least equal to but not more than three times the amount of any costs incurred by the United States as a result of such failure to comply with this Order, as provided in Section 107(c) (3) of CERCLA, 42 U.S.C. § 9607(c) (3). Should Respondents violate this Order or any portion thereof, EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Order pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606.

XXIV. ADMINISTRATIVE RECORD

88. Upon request by EPA, Respondents shall submit to EPA all documents related to the implementation of the Work for possible inclusion in the administrative record file.

XXV. EFFECTIVE DATE AND COMPUTATION OF TIME

89. This Order shall be effective five (5) days following the day that this Order is signed by the Director, Emergency and Remedial Response Division, EPA Region 2, unless a conference is timely requested pursuant to Paragraph 82, below. If such conference is timely requested, this Order shall become effective 3 days following the date the conference is held,

unless the effective date is modified by EPA. All times for performance of ordered activities shall be calculated from this effective date.

XXVI. OPPORTUNITY TO CONFER

90. Respondents may, before the effective date of the Order, request a conference with EPA to discuss this Order. If requested, the conference shall occur within 7 days of Respondents' request for a conference.

91. The purpose and scope of the conference shall be limited to issues involving the implementation of the response actions required by this Order and the extent to which Respondents intend to comply with this Order. This conference is not an evidentiary hearing, and does not constitute a proceeding to challenge this Order. It does not give Respondents a right to seek review of this Order, or to seek resolution of potential liability, and no official stenographic record of the conference will be made. At any conference held pursuant to any Respondent's request, any Respondent may appear in person or by an attorney or other representative.

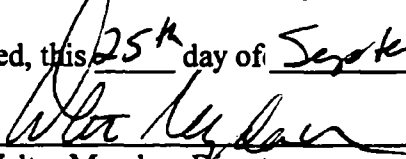
92. Requests for a conference must be by telephone followed by written confirmation sent by overnight mail and electronic mail that day to:

Damaris C. Urdaz
Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency
290 Broadway, 17th Floor
New York, N.Y. 10007-1866
Telephone: (212) 637-3140
Telecopy: (212) 637-3096
urdaz.damaris@epa.gov

XXVII. TERMINATION AND SATISFACTION

93. This Order may be terminated by EPA if Respondents demonstrate in writing and certify to the satisfaction of EPA that all Work and activities required under this Order, including any additional work required by EPA, have been performed fully in accordance with this Order and EPA concurs in writing with the certification. Such an approval by EPA, however, shall not relieve Respondents of any remaining obligations under the Order, including those requirements set forth in Section XIX regarding record preservation, or applicable law.

So Ordered, this 25th day of September, 2012.

By: 
Walter Mugdan, Director
Emergency and Remedial Response Division
U.S. Environmental Protection Agency-Region 2

Appendix A: Record of Decision Amendment

RECORD OF DECISION AMENDMENT

**NL Industries, Inc. Superfund Site
Pedricktown, Salem County, New Jersey**

U.S. Environmental Protection Agency

Region II

September 2011

DECLARATION STATEMENT
RECORD OF DECISION AMENDMENT

SITE NAME AND LOCATION

NL Industries, Inc. Superfund Site (EPA ID# NJD061843249)
Pedricktown, Oldmans Township, Salem County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the Amended Remedy for contaminated groundwater at the NL Industries, Inc. Superfund Site (the Site) located in Pedricktown, Oldmans Township, Salem County, New Jersey. The original Record of Decision (ROD) addressing contaminated soil, sediment and groundwater at the Site was issued on July 8, 1994.

The Amended Remedy was selected in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. §9601 et seq., and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300. This decision is based on the Administrative Record file for the Site, an index of which can be found in Appendix IV.

The State of New Jersey concurs with the ROD Amendment. A copy of the related concurrence letter can be found in Appendix V.

ASSESSMENT OF THE SITE

The response action selected in this ROD Amendment is necessary to protect the public health, welfare, or the environment from actual or threatened releases of hazardous substances from the Site into the environment.

DESCRIPTION OF THE SELECTED REMEDY

The response action described in this document modifies the groundwater component of the remedy selected in the 1994 ROD. The soil and sediment activities called for in the 1994 ROD have been largely completed. Some additional excavation of sediment in the West Stream is under way. A 1991 ROD addressed slag and lead oxide piles, contaminated surfaces and debris, and standing water.

The major components of the Amended Remedy include the following:

- In-situ pH adjustment and reagent injection for the contaminated unconfined aquifer via injection wells;

- Monitoring of groundwater; and
- Implementation of institutional controls to restrict the use of contaminated groundwater until cleanup goals are achieved.

DECLARATION OF STATUTORY DETERMINATIONS

Part I: Statutory Requirements

The Amended Remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial actions to the extent practicable, and is cost-effective. EPA has determined that the Amended Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site.

Part 2: Statutory Preference for Treatment

The Amended Remedy meets the statutory preference for the use of remedies that involve treatment as a principal element.

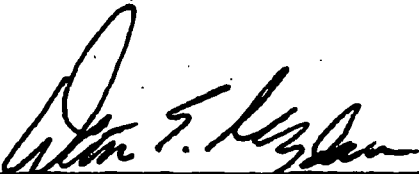
Part 3: Five-Year Review Requirements

Because the remedy will not result in hazardous substances, pollutants, or contaminants remaining above levels that allow for unlimited use and unrestricted exposure, EPA anticipates that a statutory five-year review will not be required for the groundwater remedy. However, because it may take more than five years to attain remedial action objectives and cleanup levels for the groundwater at the Site, policy reviews will be conducted until the remediation goals are achieved to ensure that the groundwater remedy is, or will be, protective of human health and the environment.

ROD DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary section of this ROD Amendment. Additional information can be found in the Administrative Record file for this Site.

- Chemicals of concern and their respective concentrations may be found in the "Site Characteristics" section.
- A discussion of source materials constituting principal threats may be found in the "Principal Threat Waste" section.
- A discussion of the baseline risk represented by the chemicals of concern may be found in the "Summary of Site Risks" section. This discussion is based on the baseline risk assessment from the 1994 ROD. Cleanup goals for groundwater contamination can be found in the "Remedial Action Objectives" section.
- Current and reasonably anticipated future land use assumptions and current and potential future uses of groundwater used in the baseline risk assessment and ROD can be found in the "Current and Potential Future Site and Resource Uses" section.
- Estimated capital, operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected can be found in the "Description of Remedial Alternatives" section.
- Key factors that led to selecting the remedy may be found in the "Comparative Analysis of Alternatives" and "Statutory Determinations" sections.



Walter E. Mugdan, Director
Emergency & Remedial Response Division
EPA - Region II

Sept. 13, 2011
Date

RECORD OF DECISION AMENDMENT

DECISION SUMMARY

NL Industries, Inc. Superfund Site

Pedricktown, Salem County, New Jersey

**U.S. Environmental Protection Agency
Region II
New York, New York
September 2011**

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SITE NAME, LOCATION AND DESCRIPTION

The Site is located to the north of Pennsgrove-Pedricktown Road, in Pedricktown, Oldmans Township, Salem County, New Jersey. The Site location is shown on Figure 1 and Figure 2. The 44-acre Site is bordered on the south by Pennsgrove-Pedricktown Road and is bisected by an active railroad (i.e., Conrail Right-of-Way). Approximately 16 acres are located north of the railroad, including a closed, 5.6-acre landfill operated and maintained by NL Industries, Inc. (NL Industries). The southern 28 acres contain the former NL Industries process area and the NL Industries landfill access road. NL Industries maintains the closed landfill area and operates the leachate collection system.

The West and East Streams, which are intermittent tributaries to the Delaware River, border the Site to the west and east, respectively. These streams receive runoff from the Site. The Delaware River is approximately 1.5 miles north of the Site. Industrial properties are located east of the former NL Industries process area. U.S. Route 130 is located north of the Site. Several residential properties are located adjacent to and west of the West Stream. Other properties in the general vicinity of the Site are used for commercial, residential, agricultural, and military purposes.

SITE CHARACTERISTICS

Site History

Between 1972 and 1984, NL Industries, Inc. and subsequently National Smelting of New Jersey (NSNJ), conducted secondary lead smelting and lead-acid battery reclamation operations. As a result of these operations, soil at the Site was contaminated with metals, primarily lead. In addition, elevated levels of lead, copper and zinc were detected in stream sediment and surface water. Groundwater contamination detected at the Site consisted primarily of lead and cadmium, with localized areas of elevated levels of volatile organic compounds (VOCs).

The Site was listed on the National Priorities List (NPL) in 1983 and a remedial investigation (RI) and feasibility study (FS) were conducted between 1986 and 1993. Between 1989 and 1996, EPA conducted multi-phased cleanup activities at the Site to address immediate public health concerns. Activities included, but were not limited to, the construction of security fences, encapsulation of slag (byproduct of smelting operations) piles, removal of toxic materials, demolition of buildings, and removal of the most highly contaminated stream sediments.

EPA divided the Site into two Operable Units (OUs) to facilitate remedial activities. A ROD for OU2 was issued by EPA in 1991 and addressed slag and lead oxide piles, contaminated surfaces and debris, and contaminated standing water. OU2 activities were initiated in 1992 and included off-site reclamation of lead-containing materials, solidification/stabilization and off-site disposal of slag and other materials, decontamination of building floors and surfaces, off-site treatment and disposal of contaminated standing water, building demolition, and environmental monitoring. The OU2 activities were completed in September 1995.

The ROD for OUI was issued by EPA in 1994 and addressed the remediation of soil, groundwater, surface water, and stream sediment. OUI activities for the soil and stream sediment were initiated in January 2000. Remedial Action Objectives (RAOs) for OUI included the following: 1) to leave no greater than 500 parts per million (ppm) of lead remaining in site soils and stream sediments; and 2) to restore the contaminated unconfined aquifer to drinking water standards for all contaminants. Established cleanup standards for each contaminant of concern (COC) for groundwater were listed in the ROD. To date, the groundwater portion of the remedy has not been implemented while the surface water, sediment and soil source removals were performed. Note that an Explanation of Significant Differences (ESD) was issued in 1999 which pertained to the soil/sediment portion of the remedy selected in the 1994 ROD. The ESD documented the change from disposing of excavated soil/sediment in an on-site landfill to the disposal of excavated soil/sediment to an off-site landfill.

OUI Soil/Sediment Activities

Remedial activities included the excavation of soil and sediment containing greater than 500 ppm of lead, as stated in the OUI RAOs. Approximately 150,928 tons of treated soil and sediment were removed and disposed of off-site. The soil and sediment remedial activities for OUI were completed in July 2003, and a biological monitoring plan was initiated. Recent sampling showed that there are lead levels in the sediment above the cleanup standards in a portion of the West Stream between Pennsgrove-Pedricktown Road and Route 130. This contaminated sediment will require additional remediation, which is scheduled to begin in September of 2011. The soil/sediment activities are not the subject of this ROD Amendment and will therefore not be discussed in further detail.

OUI Groundwater Activities

OUI groundwater monitoring was initially conducted during the RI in 1988 and 1989. Site-related contaminants were detected in the groundwater of the unconfined aquifer at the Site during the RI and the data indicated that the contamination in groundwater was limited to the unconfined aquifer. The contaminants detected in the unconfined aquifer were comprised primarily of lead and cadmium; however, VOCs, arsenic and radiological parameters were also detected in localized areas of the Site. Arsenic was later determined to be related to landfill leachate. Subsequent improvements were made to the landfill, eliminating the seeps and the arsenic detections.

As part of the remedial design (RD) for the groundwater remedy, two phases of groundwater evaluations were conducted. Phase I was conducted in 1997. Twenty groundwater samples were collected and analyzed for VOCs, semi-volatile organic compounds (SVOCs), total and dissolved metals, cyanide and radiological parameters. Water quality parameters, such as pH and oxidation-reduction potential, were also monitored. Phase I sampling identified the relationship between pH and metal solubility in groundwater. Low groundwater pH was correlated with higher concentrations of lead and cadmium in groundwater. The Phase I sampling also indicated that concentrations of COCs in groundwater at the Site had decreased since the late 1980's when the RI was conducted.

The Phase II groundwater evaluation was initiated in 1998 and included installation of additional monitoring wells, sampling of potable groundwater from residential wells along Route 130,

aquifer testing, evaluation of the capture zone of groundwater extraction wells, geochemical evaluation of Site subsurface soils, and groundwater flow and transport modeling. The radiological parameter analysis, conducted as part of the Phase II evaluation, did not indicate a radionuclide source at the Site as there was no clear pattern of radionuclide occurrence in the subsurface. Radiological parameters were only detected in samples obtained from deep-zone wells adjacent to clay layers at the Site during the Phase II evaluations, which led to the conclusion that the radiological parameters are naturally occurring and not related to former Site uses. Therefore, no further analysis of radionuclides was required. Aquifer testing was conducted to determine the adsorption capacity of the aquifer. Testing revealed that there were adequate amounts of iron and manganese oxide/hydroxide coatings in the aquifer soils to provide adsorption capacity for lead and cadmium to precipitate out of groundwater due to natural attenuation processes. Pump tests indicated that constant pumping of the contaminated groundwater would not be highly efficient at removing lead and cadmium. It was calculated that it would take between 50 and 60 years of aggressive pumping to remove lead and cadmium from the groundwater and achieve cleanup standards. Furthermore, Phase II testing continued to show a decrease in the mass of lead and cadmium remaining in the groundwater over time.

Groundwater Contamination

The Site is underlain by three hydrogeologic units: the unconfined (uppermost and water table) aquifer; the first confined aquifer; and the second confined aquifer. The unconfined aquifer is part of the Cape May Formation and averages approximately 20 feet in thickness. The unconfined and first confined aquifers are separated by a clay layer ranging in thickness from about 5 to 20 feet. The first confined aquifer exists approximately 50 to 70 feet below grade and is part of the Raritan Formation. The second confined aquifer is also part of the Raritan Formation. The first and second confined aquifers are separated by a clay layer of approximately 30 feet in thickness.

Groundwater sampling has confirmed that contamination is currently limited to the unconfined aquifer. The unconfined aquifer has historically been subdivided into two zones; the shallow and deep zones. The shallow zone generally ranges from 5 feet below ground surface (bgs) to 25 feet bgs. The deep zone generally ranges from 25 feet bgs to 50 feet bgs. The terms shallow and deep relate to screened intervals of wells and not to geologic materials. Screen depths for monitoring wells in these zones range from approximately 5 feet below grade in the shallow zone to approximately 50 feet below grade in the deeper zone. Where two wells were installed as pairs, the shallower one was labeled shallow and the deeper of the pair was labeled deep. For purposes of evaluation, where a well is not installed as part of a pair it is grouped with either shallow or deep wells based on screen depth.

Groundwater flow direction in the unconfined aquifer, as inferred based on groundwater elevation data, is primarily west across the Site towards the West Stream. The groundwater flow rate is approximately 27.5 feet per year; however, the total mass of contaminants flow at a lesser rate due to natural processes, such as precipitation and adsorption reactions, that remove contaminants from groundwater and bind them to aquifer soils, thereby limiting their mobility.

In addition to groundwater sampling in the 1980's and 1990's, groundwater monitoring was conducted in 2004, 2007 and 2010. Data from all groundwater monitoring events indicate that the lead and cadmium concentrations have generally decreased over time and that at this time the

majority of the contaminated groundwater is located beneath the former facility area (See Figures 3 through 8). Significant migration of contaminants has not been observed in recent sampling events. Between 1983 and 2010, the mass of lead in the groundwater decreased from approximately 220 pounds to 2.7 pounds. For cadmium, the mass has decreased from approximately 70 pounds in 1988 to 5.9 pounds in 2010. The current volume of groundwater impacted by lead is approximately 1.5 million gallons and 11.8 million gallons for cadmium.

Recent residential groundwater sampling was also conducted in 2004, 2006, 2007 and 2010 for those residences located north of the Site along Route 130. During each of these monitoring events, lead and cadmium concentrations in the residential water samples were either not detected, were significantly below the applicable New Jersey drinking water standards, or had minor detections believed to be a result of plumbing issues as opposed to site-related contaminant detections.

Removal of contaminated source material, as a result of OU1 soil/sediment and OU2 activities, has resulted in the observed significant decrease in lead and cadmium groundwater concentrations. Equilibrating pH values have also contributed to the continued decrease in lead and cadmium concentrations in groundwater. At low pH, metals are more soluble and tend to stay in solution. At higher pH values, the metals tend to adsorb to the aquifer soils. In 1983, groundwater pH values in the contaminated unconfined aquifer mainly ranged from a pH of 3 to a pH of 4 (See Figure 9). This lowered pH was a result of the battery acids that were released on-site as a result of the NL Industries, Inc. facility operations. More recent data from 2010 groundwater samples indicates that pH values of the contaminated unconfined aquifer are closer to a pH of 5 (See Figures 10 and 11). The natural pH range for the Site is between 5 and 6. Rising pH values are a result of natural equilibration subsequent to contaminant source removal. Oxidation-Reduction potential (Eh) also contributes to metal solubility.

While lead and cadmium have significantly decreased over time, the concentrations still exceed the current drinking water standards.

There is no distinct VOC plume at the Site; however, VOCs have historically been detected at three wells at the Site. Total VOC concentrations have generally decreased over time and these concentrations are expected to continue to decrease. Groundwater data collected in 2010 indicate that vinyl chloride and tetrachloroethene are the only site-related VOCs detected above the drinking water standards. Further, these two contaminants have been detected at only three of the twenty-eight groundwater monitoring wells at concentrations slightly exceeding the drinking water standards. Two wells had vinyl chloride concentrations of 7.7 parts per billion (ppb) and 6.9 ppb. One well had a tetrachloroethene concentration of 1.6 ppb. The cleanup standard for vinyl chloride and tetrachloroethene is 0.08 ppb and 0.4 ppb, respectively. However, the practical quantitation limit (PQL) for vinyl chloride and tetrachloroethene is 1 ppb. The PQL is the lowest concentration that can be reliably detected by a laboratory during routine laboratory operating conditions as established by NJDEP as part of the NJGWQSSs. Therefore, the cleanup standard for vinyl chloride and tetrachloroethene that can be demonstrably attainable using standard laboratory methods is 1 ppb. All COCs initially listed in the ROD, including vinyl chloride and tetrachloroethene, will continue to be monitored to ensure that cleanup levels are achieved.

HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Proposed Plan and supporting documentation for this ROD Amendment were released to the public for comment on June 22, 2011. These documents were made available to the public at the EPA Administrative Record File Room, 290 Broadway, 18th Floor, New York, New York and the Penns Grove Public Library, 222 South Broad Street, Penns Grove, New Jersey.

On June 22, 2011, EPA issued a notice in *Today's Sunbeam*, a Salem County newspaper, which contained information relevant to the public comment period for the Site, including the duration of the comment period, the date of the public meeting and availability of the administrative record. Postcards, containing the same information were also mailed to individuals on a mailing list maintained by EPA for the Site. The public comment period began on June 22, 2011 and ended on July 21, 2011.

EPA held a public meeting on July 7, 2011 to explain EPA's preferred groundwater remedy, reagent injection plus institutional controls. The purpose of the meeting was to inform local officials and interested citizens about the Superfund process, to discuss the Proposed Plan for the ROD Amendment and receive comments on the Proposed Plan, and to respond to questions from area residents and other interested parties. Responses to the comments received at the public meeting and in writing during the public comment period are included in the Responsiveness Summary, attached as Appendix III to this ROD Amendment.

CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

The Site was formerly used as a secondary lead smelting facility. As part of EPA's previous cleanup actions, all facility buildings and debris were cleared from the Site. Currently, there are no building structures located on the former facility area; however, there are a series of monitoring wells located throughout the Site which are used to monitor groundwater. Other Site features, including the closed landfill, West Stream, active rail line and wetland areas remain (See Figures 1 and 2). Residential and commercial properties are located west of the Site, along Benjamin Green Road, and north of the Site, along Route 130. Residences located along Benjamin Green Road obtain their water from the municipal water system. However, residences along Route 130 utilize water from private wells. Other properties in the vicinity of the site are used for commercial, residential, agricultural and military purposes. The former facility portion of the Site is zoned commercial. There is potential for redevelopment of the former facility portion of the Site. Since the groundwater remedy selected in this ROD Amendment calls for in-situ treatment via reagent injection, it is possible that appropriate redevelopment of the former facility area can begin prior to completion of the remedy.

BASIS FOR REMEDY MODIFICATION

This is an amendment to the July 8, 1994 ROD for the NL Industries, Inc. Superfund Site. The 1994 ROD selected extraction and treatment of groundwater and surface discharge to the Delaware River to address the threats posed by contaminated groundwater in the unconfined

aquifer. Immediate public health concerns were first addressed through the 1989 Early Removal Actions, the 1991 OU2 selected remedy and the Soil/Sediment component of the 1994 OU1 ROD, as described above. While these actions were taking place, groundwater monitoring and investigations continued to be conducted; however, the groundwater remedy was not implemented.

In addition, Five-Year Reviews were conducted in 1998, 2003 and 2008 pursuant to Section 121(c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. Section 9601, et seq., and 40 C.F.R. 300.430(t)(4)(ii) and in accordance with the Comprehensive Five-Year Review guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of a Five-Year Review is to determine whether the remedies at the Site are protective of human health and the environment and function as Intended by the decision documents. With respect to groundwater, in this interim period prior to remedy implementation, residences along Benjamin Green Road located between Pennsgrove-Pedricktown Road and Route 130 remained on the public water supply and those properties located north of the Site along Route 130 had been periodically monitored to ensure that site-related contaminants had not impacted their drinking water. Therefore, the Five-Year Reviews concluded that short-term protectiveness of human health and the environment was achieved as there is no exposure to groundwater contamination and ongoing groundwater monitoring continues to be performed.

The decreased contaminant concentrations observed in the 1997 Phase I and 1998 Phase II groundwater evaluations, as well as the groundwater monitoring data, including the most recent December 2010 data, indicate that the concentrations of COCs have significantly decreased over time. This is due in large part to source removal and natural attenuation processes. The data combined with the availability of newer remedial technologies, prompted the investigation into other potential groundwater remedies that may be more efficient for the Site than the pump and treat remedy selected in the 1994 OU1 ROD in addressing the current concentrations of contaminants in the groundwater observed at the Site.

SUMMARY OF SITE RISKS

The purpose of the risk assessment is to identify potential cancer risks and non-cancer health hazards at the Site assuming that no further remedial action is taken. A baseline risk assessment was conducted as part of the Site RI and was based on COC concentrations from groundwater samples collected in 1989. The baseline risk assessment addressed the potential risks to human health by identifying potential exposure pathways by which the public may be exposed to contaminated groundwater (via ingestion). Groundwater exposures were assessed for both potential present and future land-use scenarios. Current land use was considered to be an industrial facility and future land use was characterized as either an industrial facility or residential area in the risk assessment. Current receptors included off-site residents (child and adult) and off-site workers. Future receptors included on-site residents (child and adult), off-site residents (child and adult), on-site workers and off-site workers. Results of the quantitative risk assessment concluded that there was an unacceptable risk for the potential future receptors due to exposure to contaminated groundwater via ingestion, with the exception of the on-site worker.

The potential exposure pathways, land-use scenarios and receptors identified in the 1990 risk assessment remain applicable for the Site; therefore, the original risk assessment is still valid. An ecological risk assessment was also conducted in 1992. It was determined that the two media potentially posing a risk to ecological receptors were the stream sediment and wetland soils. Groundwater was not found to be posing a significant ecological risk.

The unconfined aquifer at the site is classified as a Class II aquifer in the state of New Jersey. The designated use of a Class II aquifer is to provide potable water and this is considered to be the most beneficial use for the aquifer. Accordingly, while the groundwater at the site is not currently being used for drinking water, the goal is to restore the aquifer to its most beneficial use.

A review of the most recent groundwater data reveals that the concentrations of COCs, primarily cadmium and lead, continue to exceed their respective NJDEP Groundwater Quality Criteria and Federal Maximum Contaminant Levels. These standards were promulgated to ensure that public water systems used as potable water sources remain protective of human health by limiting levels of contaminants in the drinking water. The RAO for the Site is to restore the site-related contaminated portions of the unconfined aquifer to drinking water standards for all contaminants; this RAO has not been met for all of the constituents. Therefore, unacceptable human health risk to a potentially exposed population from direct exposure to groundwater remains. It is EPA's current judgment that a remedy is required to restore groundwater to its most beneficial use and achieve the RAOs, and is necessary in order to protect human health and the environment.

REMEDIAL ACTION OBJECTIVES

RAOs are goals for reducing human health and environmental risks and/or meeting established regulatory requirements at the Site. Applicable or Relevant and Appropriate Requirements (ARARs) were used to define RAOs. Based on current data and evaluations of potential risk, lead and cadmium in groundwater were identified as being the primary COCs. However, Table A of the 1994 ROD (EPA, 1994) for the Site lists arsenic, beryllium, lead, 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethylene (1,1-DCE), PCE, and vinyl chloride (VC) as the COCs in groundwater. Cadmium is also considered to be a COC because of its presence in groundwater at concentrations that exceed applicable New Jersey groundwater standards. The primary risk to human health at the Site is through potential ingestion of affected groundwater.

RAOs for groundwater at the Site include the following:

- Restore the contaminated unconfined aquifer to drinking water standards for all contaminants;
- Minimize the potential for migration of the contaminants of concern in groundwater; and
- Prevent or minimize potential current and future human exposures; including ingestion of groundwater, that presents a significant risk to public health and the environment.

For the purpose of evaluating an alternative groundwater remedy for the Site, focus was placed on the primary COCs, lead and cadmium, in driving the remedy selection process. Achievement of the cleanup standards for lead and cadmium is anticipated to result in the achievement of cleanup standards for other COCs, as all of the COCs are subject to declining concentrations in groundwater by both natural attenuation and remedial activities.

While lead and cadmium are the primary COCs, the groundwater remedy will not be considered complete until all Site-related constituents have concentrations that meet the applicable standards. However, it is expected that all other Site-related constituents will meet the applicable standards within the timeframe required to remediate lead and cadmium. The criteria used to evaluate achievement of the RAOs for lead and cadmium are based on the most stringent of the current state and federal standards. For lead and cadmium, the most stringent standards are the New Jersey Groundwater Quality Standards (NJGWQSS) (NJAC 7:9C) which are 5 parts per billion (ppb) for lead and 4 ppb for cadmium. All other groundwater COCs will continue to be evaluated concurrent with the remedy implementation.

DESCRIPTION OF REMEDIAL ALTERNATIVES

CERCLA, 42 U.S.C. §9601 et seq., requires that each remedial alternative be protective of human health and the environment, be cost effective, comply with other statutory laws, and utilize permanent solutions and alternative treatment technologies to the maximum extent practicable. In addition, CERCLA includes a preference for the use of treatment as a principal element for the reduction of toxicity, mobility or volume of hazardous substances.

CERCLA requires that if a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, EPA must review the action no less than every five years after initiation of the action. In addition, institutional controls (e.g., a deed notice, an easement or a covenant) to limit the use of portions of the property may be required. These use restrictions are discussed in each alternative as appropriate. Consistent with expectations set out in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), none of the remedies rely exclusively on institutional controls to achieve protectiveness. The time frames below for achieving RAOs do not include the time for remedial design or the time to procure contracts.

As previously mentioned, this ROD Amendment is only for the groundwater component of the 1994 OUI ROD. The soil/sediment component, and all other components of the OUI ROD remain the same.

Alternative 1 – No Action

Total Capital Cost	\$0
Operation and Maintenance	\$0
Total Present Net Worth	\$0
Timeframe	0 years

The No Action alternative was retained for comparison purposes as required by the NCP. Under the No Action Alternative, no remedial actions would be taken to address groundwater contamination. Institutional and engineering controls would not be implemented to restrict the use or access to contaminated groundwater. Furthermore, there would be no monitoring associated with this alternative to evaluate progress toward achieving the RAOs.

Alternative 2 – Monitored Natural Attenuation Plus Institutional Controls

Total Capital Cost	\$163,399
Operation and Maintenance	\$1,049,805
Total Present Net Worth	\$1,213,204
Timeframe	>50 years

In this alternative, Monitored Natural Attenuation (MNA), natural attenuation processes would be used to achieve the Site-specific remediation objectives. Natural attenuation processes include biochemical reactions, dispersion, dilution and sorption processes that occur naturally in the subsurface and serve to reduce contaminant levels from groundwater at the Site. Adsorption appears to be the primary mechanism of MNA attributing to decreased contaminant concentrations at the Site. This is mainly attributable to pH levels at the Site. The pH was initially lowered due to the battery acids that were released on-site as a result of the NL Industries, Inc. facility operations. After removal of contaminant source material, the pH began to equilibrate and rise over time toward the natural pH range of 5-6 for groundwater at the Site. The increased pH fosters natural sorption reactions in the aquifer. The MNA alternative would also include a monitoring plan to track contaminant concentrations and determine when the cleanup standards have been achieved. Furthermore, this alternative would include the implementation of institutional controls, such as a Classification Exception Area (CEA), to limit potential future use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Alternative 3 – Reagent Injection Plus Institutional Controls

Total Capital Cost	\$890,489
Operation and Maintenance	\$684,766
Total Present Net Worth	\$1,575,255
Timeframe	<10 years

Reagent injection involves the introduction of a reagent into the aquifer using injection wells or well points. The reagent injection technique is based on the fact that metals dissolved or entrained in groundwater will react to form insoluble compounds and precipitate, or otherwise be immobilized by adsorption onto a substrate and/or by incorporating the metal into a molecular structure (intercalation) which may then adsorb or become incorporated into the soil as a complex or precipitate. Based on preliminary bench-scale treatability studies, it appears that phosphate reagents would be highly effective at binding both lead and cadmium in less soluble metal complexes in the groundwater. Current Site pH values are largely in the range of pH 4 – 5. A more alkaline environment (pH of approximately 8.0 – 9.0) would be created through addition of a basic compound to promote reactions between the native metals and the soil. This increased pH value is not required to be maintained following reagent injection and pH would return to

ambient levels (pH 5.0 – 6.0) over time. The reagent (likely phosphate) would then be introduced to promote intercalation reactions to permanently remove lead and cadmium from the groundwater. This remedial alternative would also include continued monitoring of all COCs, including site-related VOCs. The low concentrations of VOCs observed in recent groundwater monitoring data are expected to continue to decrease to acceptable levels.

Effectiveness of this remedial alternative would be assessed by periodic groundwater sampling and analysis to ensure that cleanup goals are achieved for all COCs. This alternative would also include implementation of institutional controls, such as a CEA, to limit potential future use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Alternative 4 – Pump & Treat Plus Institutional Controls

Total Capital Cost	\$1,560,298
Operation and Maintenance	\$4,128,108
Total Present Net Worth	\$5,688,406
Timeframe	>50 Years

In this alternative, a well system would be used to extract contaminated groundwater, which would be pumped into a treatment plant that would be constructed on-site. This was the remedy selected in the 1994 ROD and is presented here again for the purpose of comparing this remedy to the other alternatives. The treatment steps initially described in the 1994 ROD included a 250 gallon per minute pump rate and precipitation/flocculation followed by an ion-exchange polishing step. Following treatment, the water would be pumped, via a pipeline, to the Delaware River and discharged. An effluent outfall would be constructed at the discharge location. The distance from the Site to the Delaware River is approximately 1.5 miles.

Effectiveness of the pump and treat alternative would be assessed by periodic groundwater sampling and analysis. This alternative would also include implementation of institutional controls, such as a CEA, to limit potential future use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

COMPARATIVE ANALYSIS OF ALTERNATIVES

In selecting a remedy, EPA considered the factors set out in CERCLA §121, 42 U.S.C. §9621, by conducting a detailed analysis of the viable remedial response measures pursuant to the NCP, 40 CFR §300.430(e)(9) and OSWER Directive 9355.3-01. The detailed analysis consisted of an assessment of the individual response measure against each of nine evaluation criteria described below and a comparative analysis focusing upon the relative performance of each response measure against the criteria.

Threshold Criteria - The first two criteria are known as "threshold criteria" because they are the minimum requirements that each response measure must meet in order to be eligible for selection as a remedy.

1. Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative 1, No Action, is not protective of human health and the environment because this alternative does not include implementation of institutional controls to restrict the use of contaminated groundwater and does not include monitoring to determine when the applicable standards have been met and the RAOs have been achieved. Alternative 2 – MNA Plus Institutional Controls, Alternative 3 – Reagent Injection Plus Institutional Controls and Alternative 4 – Pump and Treat Plus Institutional Controls are all protective of human health and the environment as they will all result in the decrease of Site-related contaminants, include institutional controls to restrict groundwater usage until clean-up goals have been achieved and they all include a monitoring plan to determine when the RAOs have been achieved. However, Alternatives 2, 3 and 4 are estimated to achieve the cleanup standards in varying lengths of time.

2. Compliance with applicable or relevant and appropriate requirements (ARARs)

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

The three broad categories of ARARs include chemical-specific, location-specific and action-specific ARARs. ARARs have been established for groundwater as part of the OUI remedial action objective to restore the unconfined aquifer to drinking water standards. A listing of these ARARs is provided below.

Potential Chemical-Specific ARARs

Federal

- Clean Water Act, Water Quality Criteria
- RCRA Ground Water Protection Standards (40 CFR Part 264.94)
- Federal Water Quality Criteria (51 *Federal Register* 436665)
- Federal MCLs

New Jersey

- New Jersey Ground Water Quality Standards (NJGWQS) (NJAC 7:9-6)
- New Jersey MCLs
-

Potential Action-Specific ARARs

Federal

- RCRA Groundwater Monitoring and Protection Standards (40 CFR 264, Subpart F)

- Clean Water Act – NPDES Permitting Requirements for Discharge of Treatment System Effluent (40 CFR 122-125)
- EPA Action Level for Lead in Drinking Water

New Jersey

- New Jersey Pollutant Discharge Elimination System Regulations (NJPDES) and Effluent Limitations (NJAC 7:14A et seq)

Potential Location-Specific ARARs

Federal

- Fish and Wildlife Coordination Act (16 USC 661 et seq.)
- National Environmental Policy Act (42 USC 4341 et seq.)
- Natural Historic Preservation Act
- Endangered Species Act
- Coastal Zone Management Act
- Farmland Protection Policy Act

New Jersey

- New Jersey Rules on Coastal Resources and Development (7:7E-1.1 et seq.)
- New Jersey Freshwater Wetlands Regulation

Alternative 1, No Action, would not comply with ARARs since a determination as to whether or not the applicable standards have been met would not be able to be made due to the lack of monitoring. Alternatives 2, 3 and 4 are expected to comply with the applicable ARARs; however, Alternative 4 would have more applicable ARARs, compared to Alternatives 2 and 3, due to the construction of the groundwater treatment plant and discharge of treated water (NJPDES requirements, construction permits, etc.).

Primary Balancing Criteria - The next five criteria, criteria 3 through 7, are known as "primary balancing criteria". These criteria are factors with which tradeoffs between response measures are assessed so that the best option will be chosen, given site-specific data and conditions.

3. Long-term Effectiveness and Permanence

A similar degree of long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on-site following remediation and the adequacy and reliability of controls.

Alternative 1, No Action, does not provide a mechanism to monitor contaminant migration or attenuation; therefore long-term effectiveness and permanence cannot be determined. Alternative 2 – MNA Plus Institutional Controls, Alternative 3-Reagent Injection Plus Institutional Controls and Alternative 4-Pump and Treat Plus Institutional Controls are all expected to mitigate long-term risks from Site contaminants; however, for each alternative, the timeframes and mechanisms for achieving the cleanup goals vary significantly.

Alternative 2 relies on natural attenuation processes to remove lead and cadmium from the groundwater. These processes occur through cation exchange or precipitation, if the pH conditions required for precipitation are present (higher pH values). Therefore, as the pH at the site naturally equilibrates toward ambient pH values (between pH 5 and pH 6) increasing amounts of lead and cadmium will precipitate out of the groundwater. Once a precipitate is formed, it may directly adsorb to the aquifer matrix and render the contaminant immobile. Studies referenced in the Focused Feasibility Study for Groundwater Remediation (FFS) demonstrated the presence of iron and manganese oxide/hydroxide coatings on soil particles in the subsurface at the Site. The iron and manganese oxide/hydroxide coatings provide adsorption sites in the soil for lead and cadmium. The results of the Phase II evaluation, described in the Site History Section above, documented that the aquifer soil has more than enough capacity to adsorb the remaining lead and cadmium present in groundwater at the Site. The stability of the immobilized constituents is directly related to the pH and Eh of groundwater at the Site and the geochemical reactions that occur. The Phase II study included a sequential extraction analysis. This analysis used sequentially more acidic solutions to extract cadmium and lead from the soil samples provided. The study concluded that a solution with a pH of less than 2 was needed to extract cadmium and lead from the soil samples at detectable concentrations. The study verifies that after adsorption of lead and cadmium onto soil, it would be reasonably permanent because conditions causing an ambient groundwater pH of 2 or less are very unlikely to occur at the Site.

The Alternative 3 reagent injection technology removes cadmium and lead from solution through a process that is more complex than that described above for Alternative 2. With Alternative 3, lead and cadmium are precipitated out of solution through the formation of metal phosphates (phosphate was identified as the likely reagent based on a Bench Scale Treatability Study but would be confirmed in a Pilot Study). In this process, a host crystal, is formed in solution and the target metal is incorporated into the host crystal and simultaneously rendered insoluble and inert and the crystal structure is incorporated within the native rock. In order to foster this more complex reaction, Alternative 3 requires an initial pH adjustment of the groundwater to create a more alkaline environment (pH of approximately 8.0 to 9.0) through the addition of a basic compound to promote the desired reaction between the primary COCs and the aquifer soils. Prior to the injection of reagents a basic solution, such as sodium hydroxide, can be used to increase the pH of the groundwater in localized areas to promote subsequent removal of lead and cadmium from groundwater when the reagent is injected. The increased pH value is not required to be maintained following reagent injection and will naturally return to ambient levels (i.e., pH of approximately 5.0 to 6.0) over time. The ambient pH will not cause any significant resolubilization of lead or cadmium after the metals have reacted to form metal phosphate compounds and/or these phosphate compounds have adsorbed to the aquifer materials.

Alternative 4 – Pump and Treat technology involves pumping groundwater from the contaminated unconfined aquifer into a treatment plant where a series of process steps, including precipitation/flocculation followed by an ion-exchange polishing step, would remove the contaminants from the groundwater. Treated groundwater would then be directly discharged to the Delaware River via a pipeline.

Alternative 2-MNA and Alternative 4-Pump and Treat would be effective in the long term but would require significantly longer periods of time to meet the applicable standards compared to Alternative 3 – Reagent Injection.

4. Reduction of Toxicity, Mobility, or Volume of contaminants through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Groundwater concentrations of Site-related contaminants have generally decreased over time, as evidenced through the groundwater monitoring events. Furthermore, there has been minimal migration of the impacted groundwater. All alternatives, with the exception of Alternative 1 – No Action, are expected to reduce the toxicity, mobility or volume of contaminants to meet the applicable standards; however, the alternatives are estimated to achieve these reductions at different rates and through different mechanisms. Alternative 2 – MNA Plus Institutional Controls and Alternative 3 – Reagent Injection Plus Institutional Controls both utilize natural processes, including biochemical reactions, dispersion, dilution and sorption; however, Alternative 3 includes the enhanced formation of metal phosphates which further removes lead and cadmium from groundwater.

5. Short-term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1 – No Action, has no impact on short-term effectiveness. Alternative 2 – MNA and Alternative 3 – Reagent Injection are expected to have minimal impacts on remediation workers and nearby residents during remedy implementation. Alternative 2 – MNA involves the installation of monitoring wells and Alternative 3 – Reagent injection involves the installation of monitoring wells and injection points for in-situ treatment of the contaminated groundwater. Alternative 4 – Pump and Treat involves ex-situ treatment of contaminated groundwater through the construction of a groundwater treatment plant which is anticipated to take longer to construct, would be more intrusive, and have more short-term impacts related to construction.

The potential risks to Site workers and area residents during remedy implementation for each alternative could be addressed by adherence to protective worker practices, safety standards, and equipment. A Site-specific health and safety plan will be prepared and trained personnel will perform remedial activities. Appropriate personnel monitoring and emission controls and monitoring will be provided, as needed, during remedy implementation.

Alternative 2 – MNA Plus Institutional Controls and Alternative 4 – Pump and Treat Plus Institutional Controls are expected to take over 50 years to reduce the contaminant levels to concentrations meeting the applicable standards. Alternative 3 – Reagent Injection Plus Institutional Controls is expected to reduce contaminant levels to concentrations meeting the applicable standards in less than 10 years. This increased rate of reduction of toxicity, mobility and volume is due to the mechanisms in which the primary contaminants of concern, lead and cadmium, will be removed from solution.

6. Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

All of the alternatives are technically and administratively feasible, have been implemented at other similar sites, and make use of standard engineering practices. Alternative 1 - No Action requires the least effort to implement; however, without having the monitoring component to determine effectiveness of the remedy, it would not demonstrate when RAOs have been met.

Alternative 2 – MNA Plus Institutional Controls would be the most readily implementable alternative as it only involves installation of monitoring wells and subsequent monitoring. Alternative 3 – Reagent Injection would require a pilot study to optimize its effectiveness as well as the installation of monitoring and injection wells. Alternative 4 – Pump and Treat Plus Institutional Controls would be the most difficult to implement as it would require the greatest degree of construction and acquisition of permits, such as the NJPDES permit for off-site discharge of the treated groundwater. The availability of service and materials required for the implementation of all alternatives is adequate. All alternatives, other than Alternative 1, require services and materials that are currently readily available from technology vendors, and are therefore, not expected to present a challenge to remedy implementation.

7. Cost

Includes estimated capital and operation and maintenance costs, and net present-worth values.

Alternative 1 - No Action has the lowest capital cost, but because of the lack of monitoring, achievement of remedial success could not be measured. Aside from Alternative 1 – No Action, Alternative 2 - MNA Plus Institutional Controls has the lowest capital cost of \$163,399 and would be the least costly alternative to implement with a total present net worth of approximately \$1.2 million which includes a 30-year groundwater monitoring program and well installation. Alternative 3 – Reagent Injection Plus Institutional Controls is estimated to have a capital cost of \$890,489 and an overall present net worth cost of approximately 1.6 million assuming a 10-year groundwater monitoring program. This is comparable to the cost of Alternative 2. Alternative 4 – Pump and Treat Plus Institutional Controls is the most expensive alternative with an estimated capital cost of \$1.6 million and a present net worth cost of approximately \$5.7 million which includes a 30-year groundwater monitoring program.

Modifying Criteria - The final two evaluation criteria, criteria 8 and 9, are called "modifying criteria" because new information or comments from the state or the community on the Proposed Plan may modify the preferred response measure or cause another response measure to be considered

8. State Acceptance

Indicates whether based on its review of the RI/FS reports and the Proposed Plan, the state supports, opposes, and/or has identified any reservations with the selected response measure.

The State of New Jersey concurs with EPA's Selected Remedy.

9. Community Acceptance

Summarizes the public's general response to the response measures described in the Proposed Plan and the R/FS reports. This assessment includes determining which of the response measures the community supports, opposes, and/or has reservations about.

EPA solicited input from the community on the remedial alternatives proposed for the Site. The community was generally supportive of EPA's Proposed Plan for the ROD Amendment. Appendix III, The Responsiveness Summary, addresses the comments received at the public meeting and written comments received during the public comment period.

PRINCIPAL THREAT WASTE

Principal threat wastes are considered source materials, i.e., materials that include or contain hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or as a source for direct exposure. This ROD Amendment addresses groundwater contamination. Contaminated groundwater generally is not considered to be a source material and is therefore not categorized as a "principal threat."

SELECTED REMEDY

Based upon consideration of the results of groundwater investigations at the Site, the requirements of CERCLA, the detailed analysis of the remedial alternatives and public comments, EPA has determined that Alternative 3 – Reagent Injection Plus Institutional Controls is the appropriate remedy for the treatment of contaminated groundwater at the Site. This remedy best satisfies the requirements of CERCLA Section 121 and the NCP's nine evaluation criteria for remedial alternatives, 40 CFR §300.430 (e) (9). This remedy includes the following components:

- In-situ pH adjustment and reagent injection for the contaminated unconfined aquifer via injection wells;
- Monitoring of groundwater; and
- Implementation of institutional controls to restrict the use of contaminated groundwater until clean-up goals are achieved.

Reagent Injection is an in-situ treatment whereby a reagent is injected into the groundwater aquifer via injection wells or well points. The reagent to be applied will be selected based upon the results of the bench-scale treatability study (BSTS), as presented in the FFS, and a field pilot study, which will be conducted as part of the Remedial Design. Preliminarily, the results of the BSTS reveal that phosphate reagents will be highly effective for treating lead and cadmium in groundwater. The use of phosphates for treating impacted soils and waters has been widely used to immobilize inorganic constituents, including lead. Note that many of the available reagents are commonly used in water treatment applications. For example, trisodium polyphosphate (TSPP) is

used in drinking water systems and has been found to have no deleterious environmental impacts. However, one of the goals of pilot testing will be to determine the amount of reagent required to minimize unreacted phosphate. The field pilot study will confirm effectiveness at the Site and assist in calculating parameters required for successful remediation (i.e., number of well points, spacing, application method, etc.).

The reagent injection technique is based on the fact that metals dissolved or entrained in groundwater may react to form insoluble compounds and precipitates, or otherwise be immobilized by adsorption onto a substrate (i.e., the native soil) and/or by incorporating the metal into a molecular structure (intercalation) which may then adsorb or become incorporated into soil as a complex or precipitate. Reactions with phosphates tend to result in intercalation under proper conditions.

Currently, groundwater within the contaminated unconfined aquifer has a pH range of 4.0 to 5.0. In order to promote the desired reactions, a more alkaline environment (pH of approximately 8.0 – 9.0) will be created prior to the reagent injection through addition of a basic compound into the groundwater aquifer to foster reactions between the native metals and the soil. The reagent will then be injected into the groundwater aquifer via a number of injection points. In this process, a host crystal is formed in solution and the target metal (lead or cadmium) is incorporated into the host crystal and simultaneously rendered insoluble and inert and the crystal structure is incorporated within the native rock of the aquifer. The increased pH value is not required to be maintained following reagent injection and will naturally return to ambient levels (i.e., pH of approximately 5.0 to 6.0) over time. The ambient pH will not cause any significant resolubilization of lead or cadmium after the metals have reacted to form metal phosphate compounds and/or these phosphate compounds have adsorbed to the aquifer materials. Therefore, the precipitate will remain stable over time. Generally speaking, precipitation reactions, such as those induced through certain injection reagents, including phosphates, follow a kinetic order of reaction. The order of reaction varies from compound to compound and with the geochemical conditions in which the reagent is applied (e.g., pH and reagent concentration); however, with the current Site conditions and concentrations of lead and cadmium in groundwater, it is anticipated that lead and cadmium will react with the phosphates first, followed by the non-target compounds (i.e., calcium and aluminum). This remedial alternative will also include continued monitoring of all COCs initially listed in the 1994 ROD, including site-related VOCs. EPA will assess the concentrations of the other site COCs throughout the implementation of the remedy and at the conclusion of the in-situ remedial action to address the primary COCs of lead and cadmium. If, at the conclusion of the remedy, the levels for these residual COCs continue to exceed cleanup standards, EPA will develop a strategy to address this issue.

The effectiveness of the remedy will be assessed by periodic groundwater sampling and analysis. Quarterly sampling is proposed initially; however, the monitoring frequency will be modified based upon the data obtained during the pilot study and initial post-reagent injection monitoring events.

Institutional controls, including a CEA, will also be implemented to prevent exposure to contaminated groundwater until the cleanup standards have been achieved for all COCs.

This remedy is estimated to take less than 10 years to achieve the cleanup standards. Therefore, as per EPA policy, 5-Year Reviews will be performed until remedial goals are achieved.

The remedy was selected over other remedies because it is expected to achieve substantial and long-term risk reduction through treatment in the most efficient and timely manner.

Based on information currently available, EPA believes the Reagent Injection Plus Institutional Controls remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. EPA expects the selected remedy will satisfy the statutory requirements of CERCLA Section 121(b); however, Alternative 4 – Pump and Treat Plus Institutional Controls will be retained as a contingency remedy.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of the selected remedy.

STATUTORY DETERMINATIONS

As previously noted, CERCLA Section 121(b)(1) mandates that a remedial action must be protective of human health and the environment, cost-effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. CERCLA Section 121(b)(1) also establishes a preference for remedial actions that employ treatment to permanently and significantly reduce the volume, toxicity, or mobility of the hazardous substances, pollutants, or contaminants at a site. CERCLA Section 121(d) further specifies that a remedial action must attain a degree of cleanup that satisfies ARARs under federal and state laws, unless a waiver can be justified pursuant to CERCLA Section 121(d)(4). For the reasons discussed below, EPA has determined that the Selected Remedy meets the requirements of CERCLA Section 121.

Protection of Human Health and the Environment

The Selected Remedy will adequately protect human health and the environment through the in-situ treatment of contaminated groundwater in the unconfined aquifer via reagent injection. This process will reduce lead and cadmium concentrations in groundwater to levels that meet the NJGWQS. Implementation of institutional controls will prevent exposure to contaminated groundwater by restricting its use until the cleanup goals are achieved for all COCs. Implementation of the Selected Remedy will not pose unacceptable short-term risks or adverse cross-media impacts.

Compliance with ARARs

The following ARARs have been determined to be potentially applicable to the Selected Remedy:

Potential Chemical Specific ARARs

Federal

- Clean Water Act, Water Quality Criteria
- RCRA Ground Water Protection Standards (40 CFR Part 264.94)
- Federal Water Quality Criteria (51 Federal Register 436665)
- Federal MCLs

State

- New Jersey Ground Water Quality Standards (NJGWQS) (NJAC7:9-6)
- New Jersey MCLs

Potential Action Specific ARARs

Federal

- RCRA Groundwater Monitoring and Protection Standards (40 CFR 264, Subpart F)
- EPA Action Level for Lead in Drinking Water

State

- New Jersey Pollutant Discharge Elimination System Regulations (NJPDES) and Effluent Limitations (NJAC 7:14A et seq)
- New Jersey Well Construction and Maintenance; Sealing of Abandon Wells N.J.A.C. 7:9D

Potential Location Specific ARARs

Federal

- Fish and Wildlife Coordination Act (16 USC 661 et seq.)
- National Environmental Policy Act (42 USC 4341 et seq.)
- Endangered Species Act
- Coastal Zone Management Act
- Farmland Protection Policy Act

State

- New Jersey Rules on Coastal Resources and Development (7:7E-1.1 et seq.)
- New Jersey Freshwater Wetlands Regulation

The Selected Remedy is compliant with all ARARs. With respect to the primary contaminants of concern, lead and cadmium, the NJGWQS are the most stringent of the chemical specific ARARs. The standards for lead and cadmium under these regulations are 5 ppb and 4 ppb, respectively. At the completion of the response action, the Selected Remedy will meet the identified ARARs, including the chemical specific ARARs for all COCs in groundwater.

Cost-Effectiveness

In EPA's judgment, the Selected Remedy is cost-effective and represents reasonable value for the money to be spent. Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination (long-term effectiveness and permanence; reduction in toxicity, mobility and volume through treatment; and short-term effectiveness). Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the Selected Remedy has been determined to be proportional to the costs, and the Selected Remedy, therefore, represents reasonable value for the money to be spent. The estimated present net worth cost of the Selected Remedy is \$1,575,255.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA has determined that the Selected Remedy represents the maximum extent to which permanent solutions and treatment technologies can be utilized in a practicable manner at the Site. EPA has determined that the Selected Remedy provides the better balance of trade-offs with respect to the five balancing criteria. The Selected Remedy satisfies the criteria for long-term effectiveness and permanence by removing the primary COCs, cadmium and lead, from solution by precipitating them as metal phosphates. This technology removes the contaminants from solution and provides groundwater that meets or exceeds the cleanup standards. The Selected Remedy, coupled with ongoing natural attenuation processes, is expected to meet cleanup standards for all COCs in the contaminated unconfined aquifer.

Since the Selected Remedy involves in-situ techniques, there are no significant short-term risks associated with the implementation of the remedy. However, with respect to exposure to contaminated groundwater, institutional controls will assure short-term protectiveness by preventing or minimizing potential current and future human exposures to the contaminated groundwater until the groundwater cleanup standards are achieved.

The Selected Remedy is implementable since it employs standard technologies that are readily available.

Preference for Treatment as a Principal Element

Through the use of an in-situ technology to treat the groundwater contamination, the Selected Remedy meets the statutory preference for the use of remedies that employ treatment that reduces toxicity, mobility or volume as a principal element to address the principal threats at the Sites.

Five-Year Review Requirements

Because the remedy will not result in hazardous substances, pollutants, or contaminants remaining above levels that allow for unlimited use and unrestricted exposure in groundwater, EPA anticipates that a five-year review will not be required for the groundwater remedy.

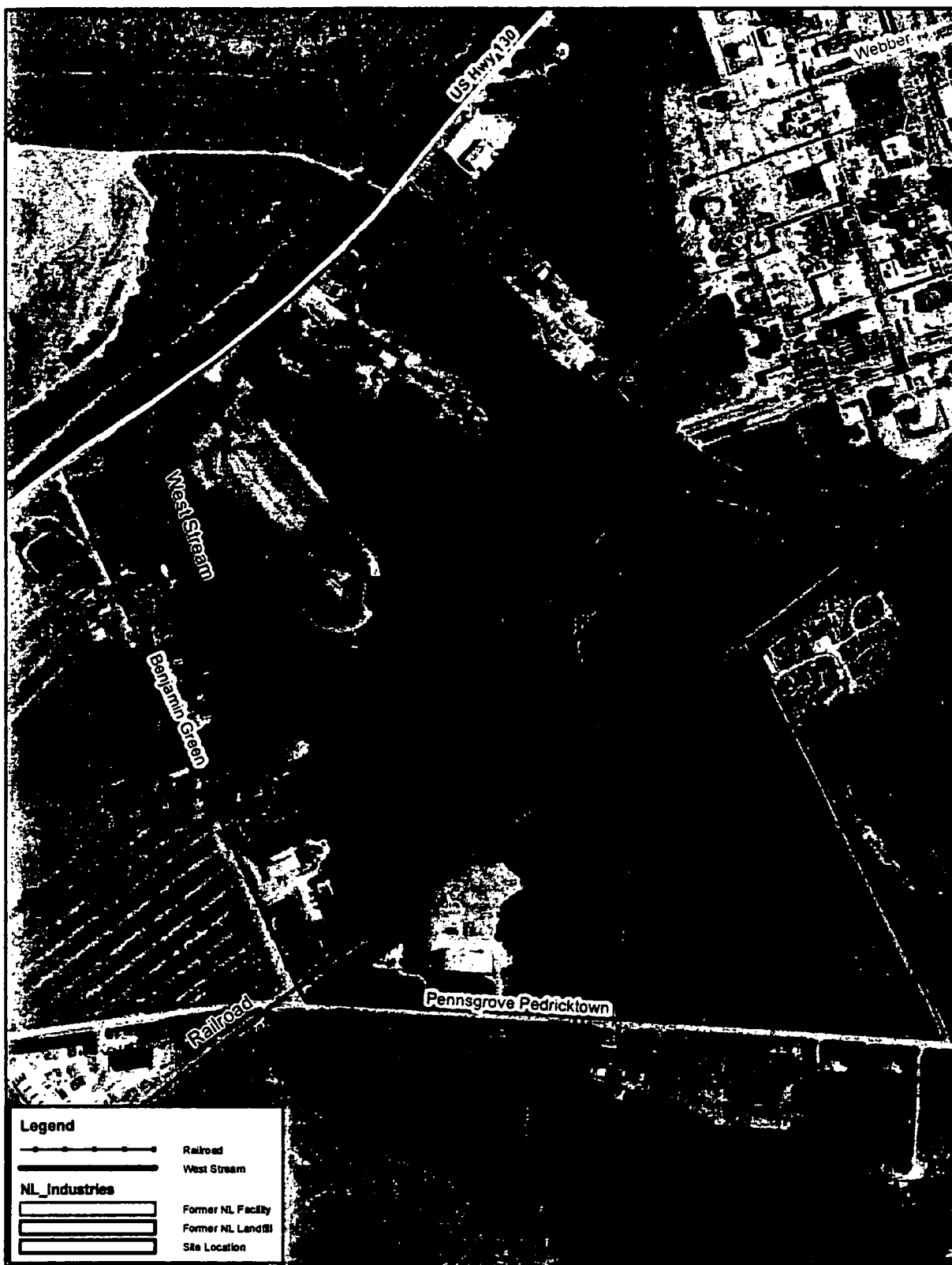
However, because it may take more than five years to attain remedial action objectives and cleanup levels for the groundwater at the Site, policy reviews will be conducted until the remediation goals are achieved to ensure that the groundwater remedy is, or will be, protective of human health and the environment.

DOCUMENTATION OF SIGNIFICANT CHANGES

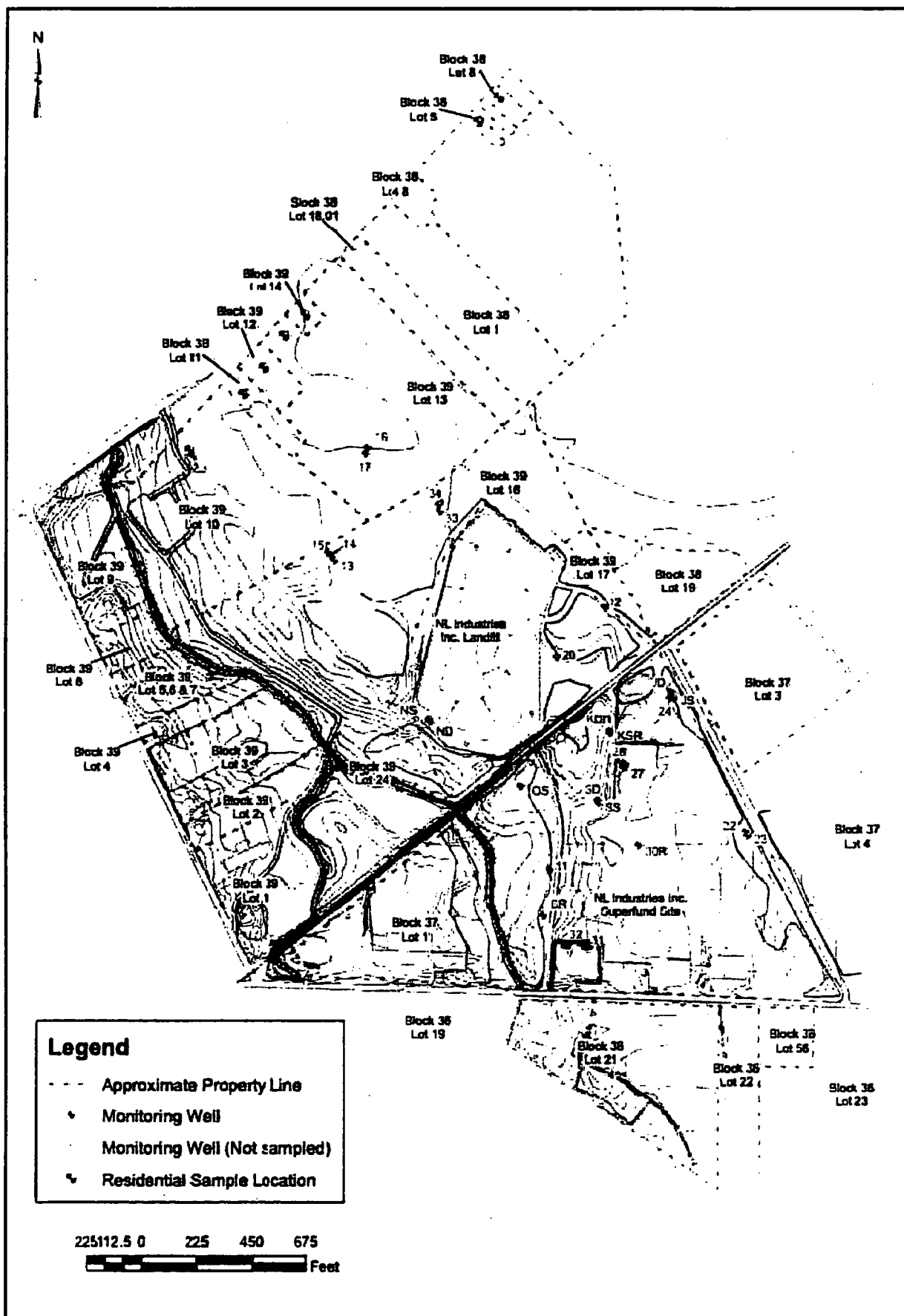
The Proposed Plan for this ROD Amendment for the Site was released for public comment on June 22, 2011. The comment period closed on July 21, 2011. All verbal and written comments submitted during the public comment period were reviewed by EPA. Upon review of the comments, it was determined that no significant changes to the remedy, as was originally identified in the Proposed Plan, were necessary.

APPENDIX I - FIGURES

NL Industries Superfund Site Pedricktown, NJ



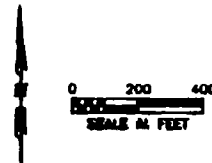
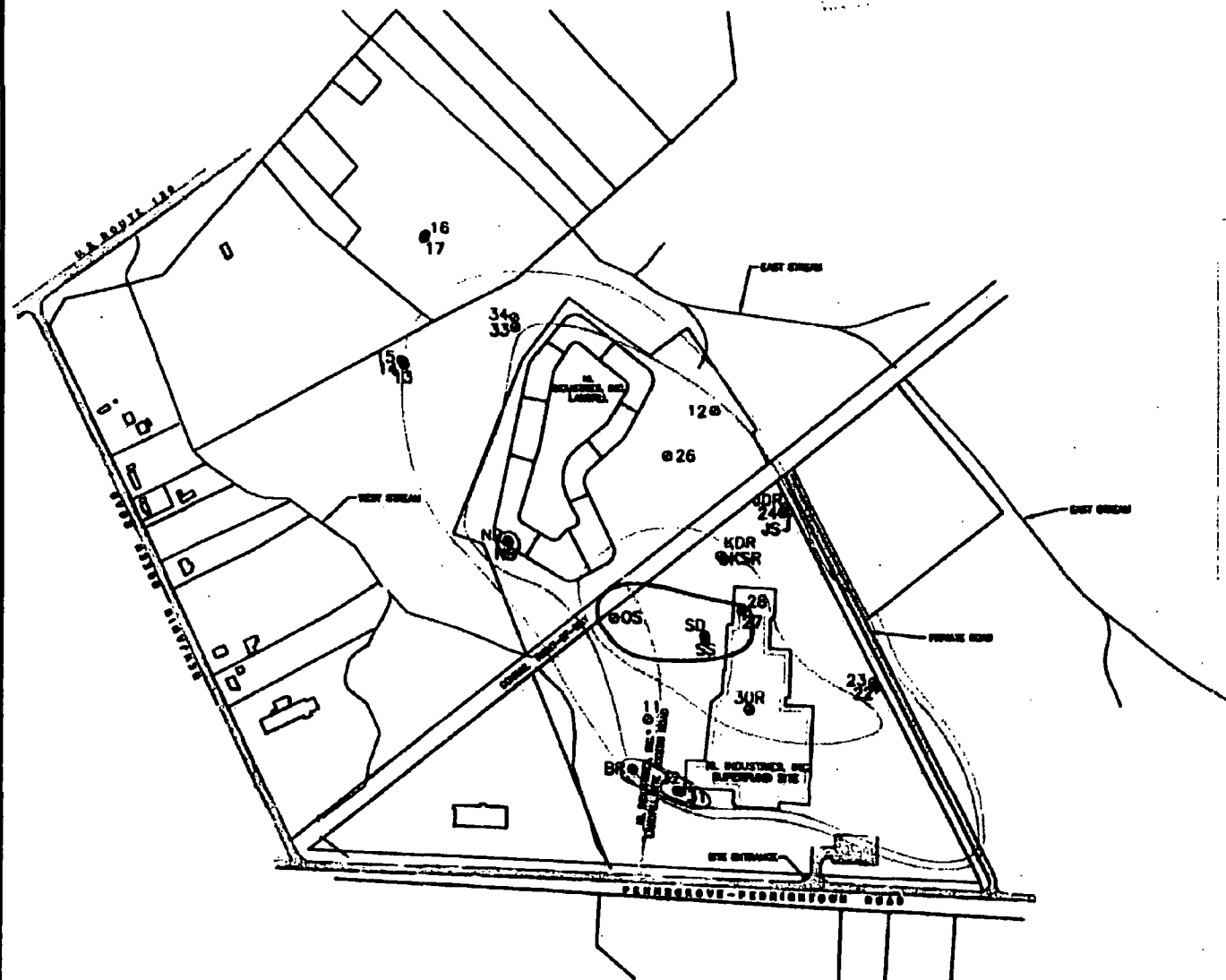
US EPA Region 2
Map Created 5/15/2010



CSI Environmental, LLC
918 Choptank Ave.
Annapolis, MD 21403
410-288-2763

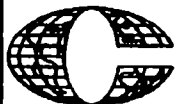
**Monitoring Well
and Sample Locations**
NL Industries, Inc. Superfund Site
Pedricktown, NJ

**Figure
2**



Legend

- Property Line
- Stream
- 110 Existing Mts
- Areas with Pb concentrations greater than the NJGWQC
- 1988 (Area = 2,274,276.10 sq ft)
- 1988 (Area = 1,714,843.66 sq ft)
- 1988 (Area = 421,922.14 sq ft)
- 2007 (Area = 127,882.94 sq ft)
- 2010 (Area = 138,938.63 sq ft)



CSI Environmental, LLC

818 Chesapeake Ave.
Annapolis, MD 21403
410-288-2785

Drafter: M. Hickey

Approved By: J.D. Ferris

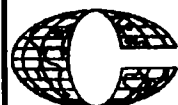
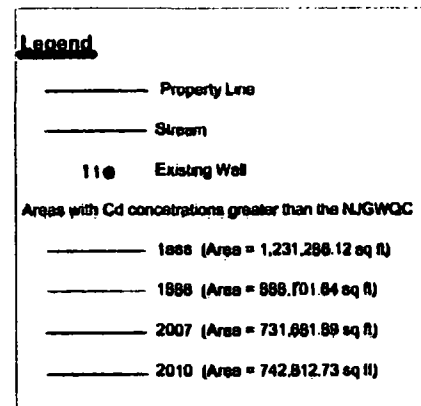
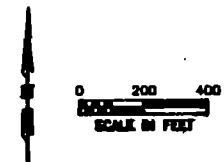
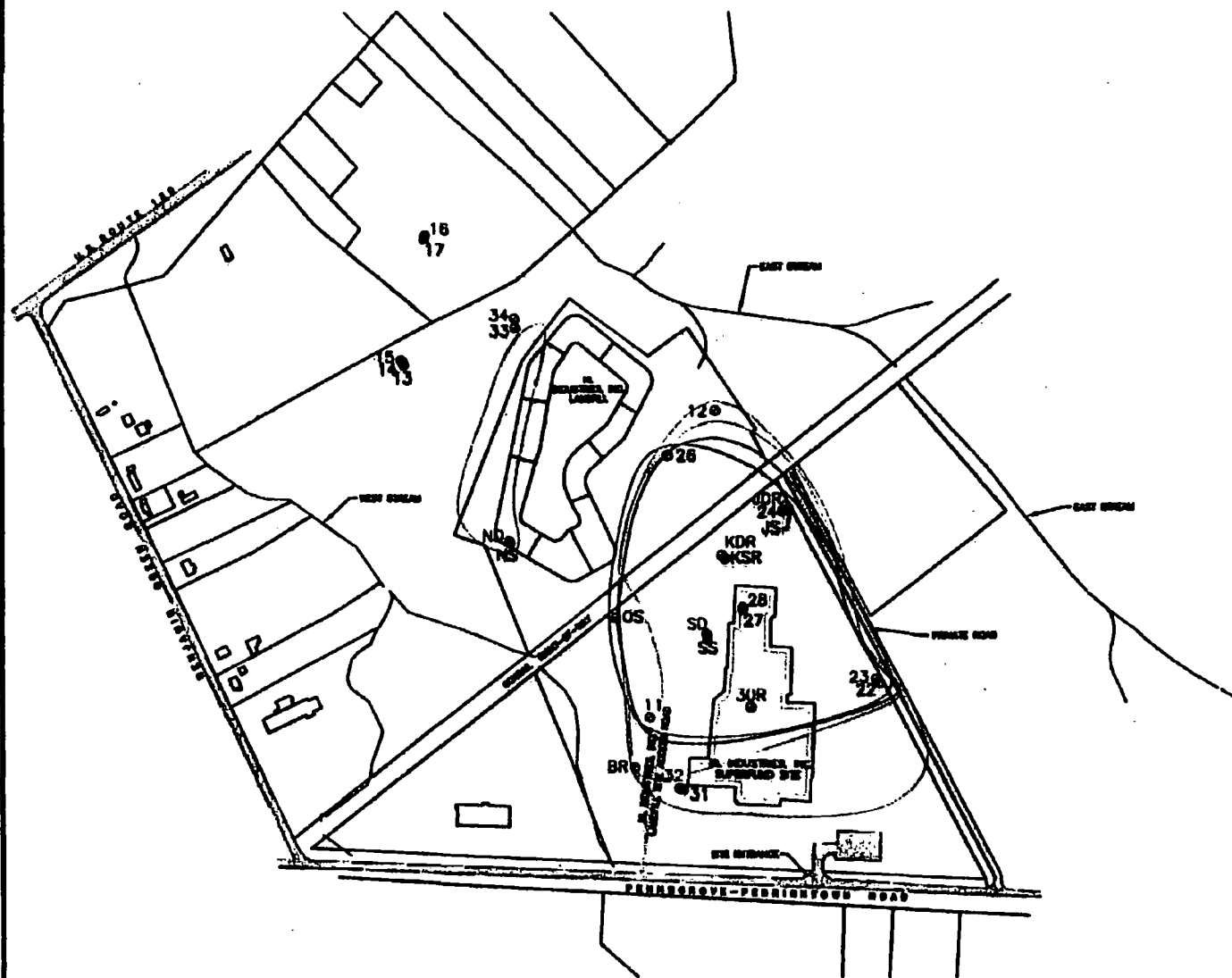
Prepared: 2/10/2011

**HISTORICAL EXTENT OF LEAD CONCENTRATIONS
ABOVE THE GROUNDWATER QUALITY STANDARD**

NL Industries, Inc. Superfund Site
Padricktown, NJ

FIGURE

3



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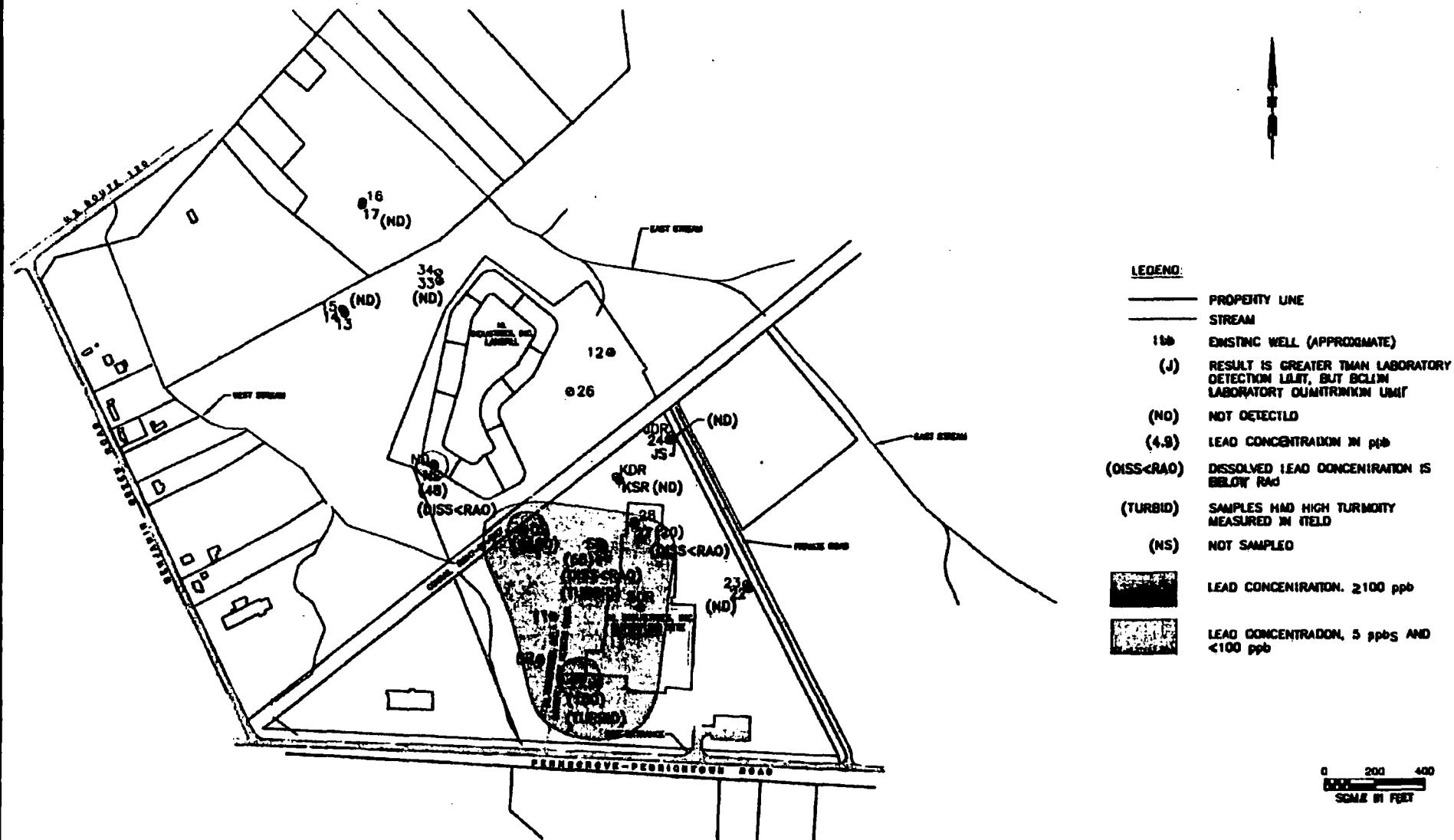
Prepared: 2/10/2011

HISTORICAL EXTENT OF CADMIUM CONCENTRATIONS ABOVE THE GROUNDWATER QUALITY STANDARD

NL Industries, Inc. Superfund Site
Pedricktown, NJ

FIGURE

4



CSI Environmental, LLC

918 Chesapeake Ave.
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410-268-2765

Drafter: M. Hickey

Approved By: J.D. Ferris

Prepared: 2/2/2011

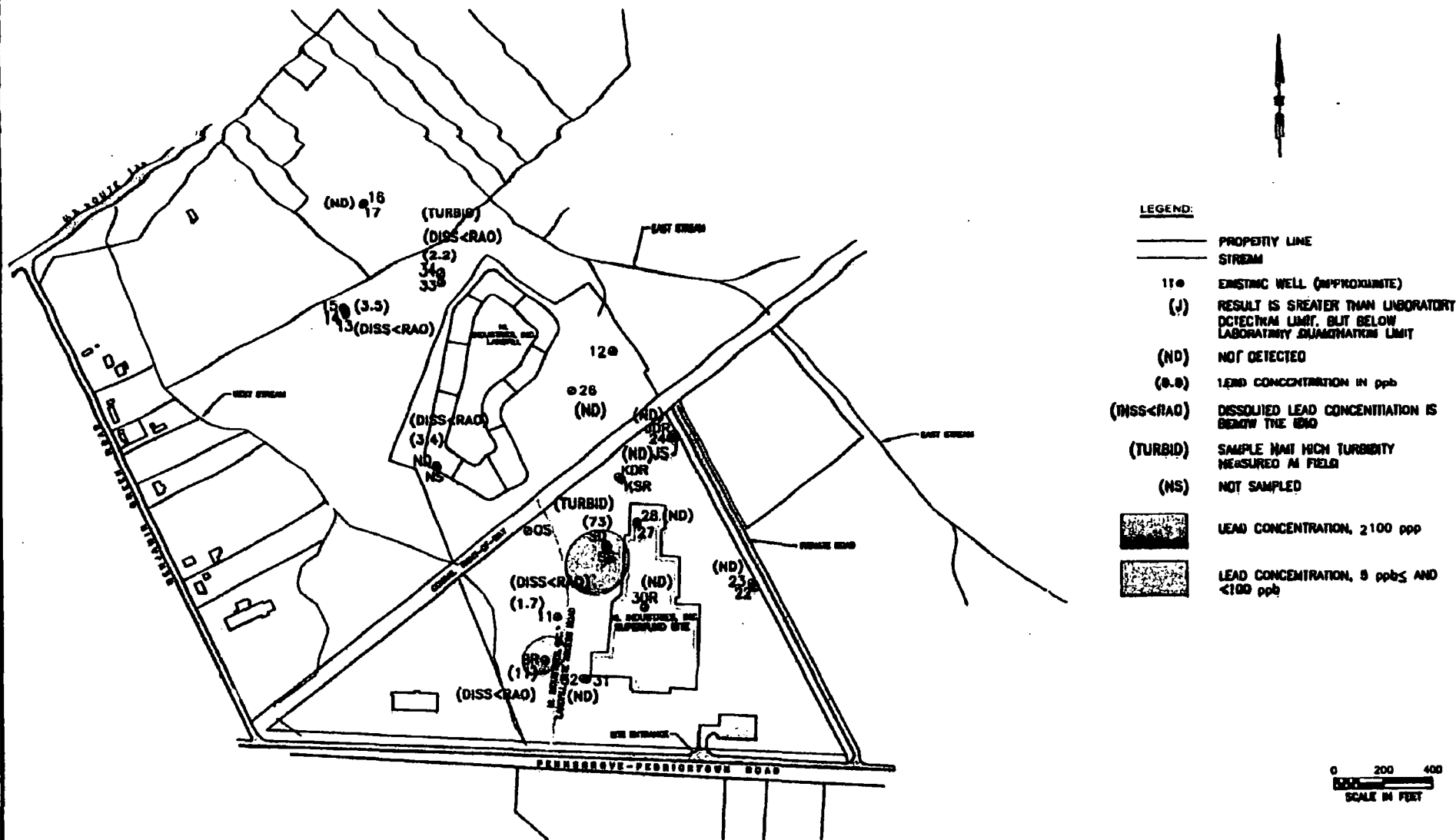
Total Pb Distribution - Shallow Zone

November 2010

NL Industries, Inc. Superfund Site
Petticktown, NJ

FIGURE

5



CSI Environmental, LLC

518 Chesapeake Ave.
Annapolis, MD 21403
410-268-2765

Drafter: M. Hickey

Approved By: J.D. Ferris

Prepared: 2/2/2011

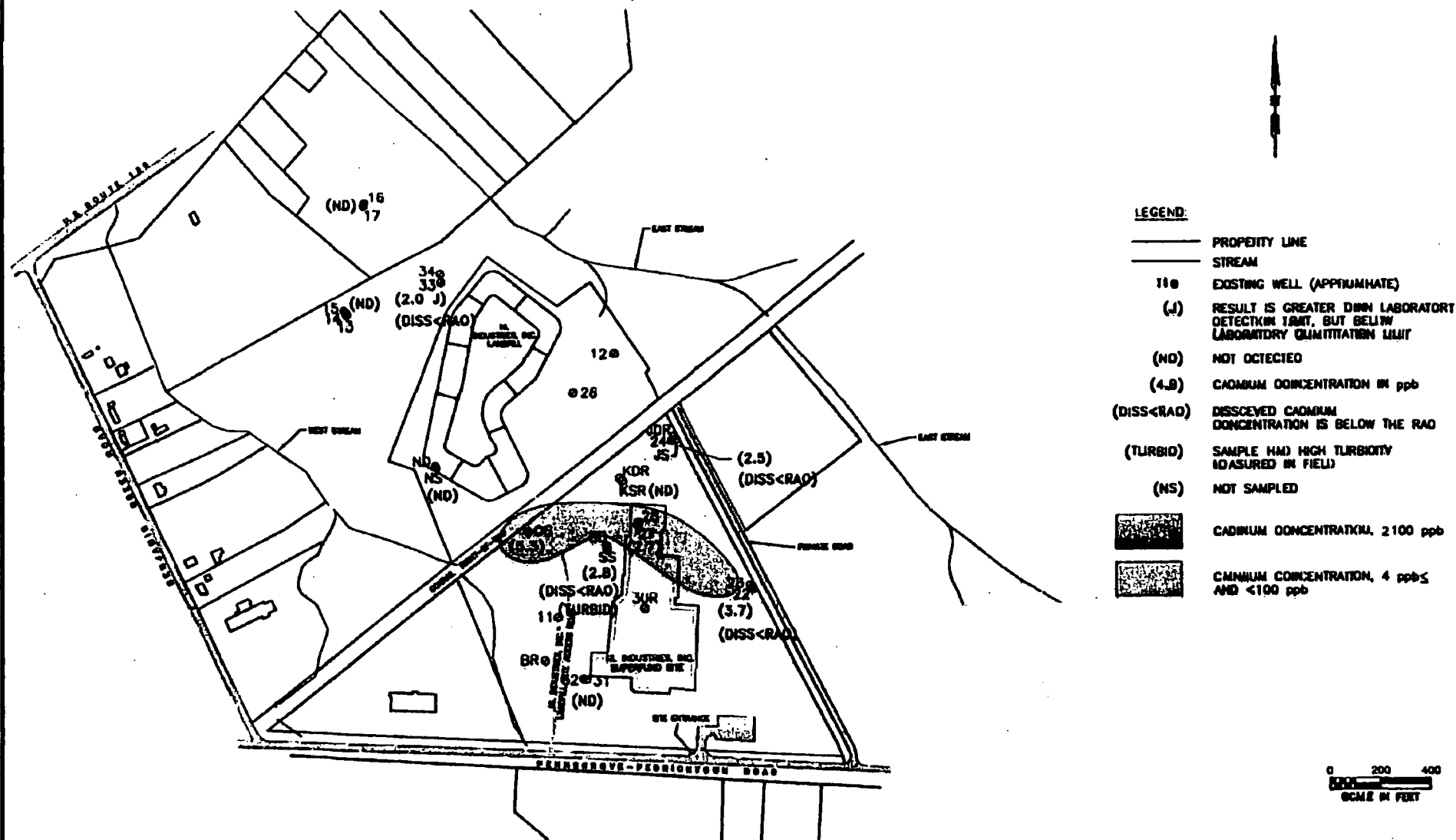
Total Pb Distribution - Deep Zone

November 2010

NL Industries, Inc. Superfund Site
Padricktown, NJ

FIGURE

6



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918 Chesapeake Ave.
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410-268-2765

Drafter: M. Hickey

Approved By: J.D. Ferris

Prepared: 2/2/2011

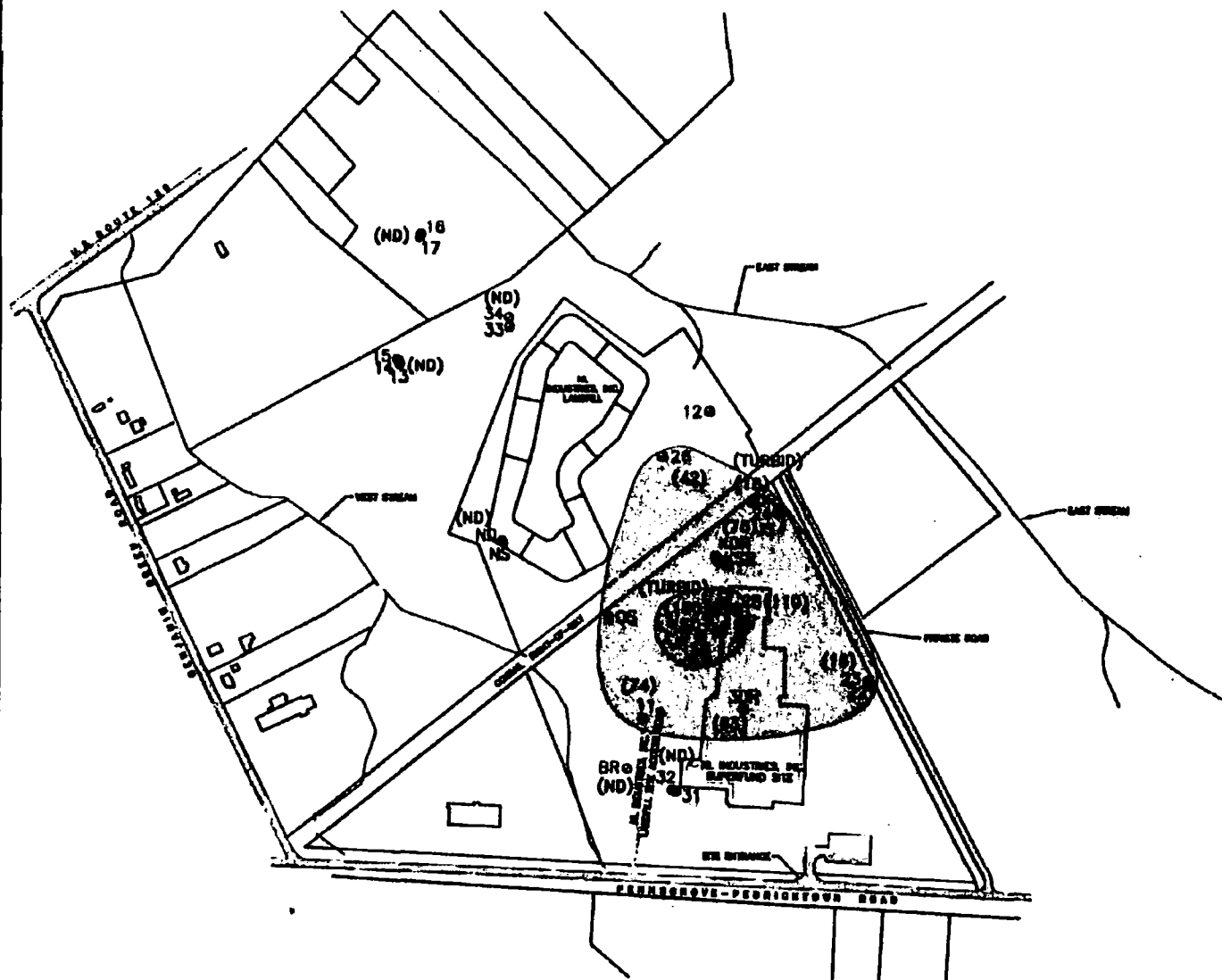
Total Cd Distribution - Shallow Zone

November 2010



NL Industries, Inc. Superfund Site
Podricktown, NJ

FIGURE

7



LEGEND:

- PROPERTY LINE
- STREAM
- 11 ● CISTING WELL (APPROXIMATE)
- (J) RESULT IS GREATER THAN LABORATORY DETECTION LIMIT, BUT BELOW LABORATORY QUANTITATION LIMIT
- (ND) NOT DETECTED
- (4.9) CADMIUM CONCENTRATION IN PPB
- (DISS<BAD) DISSOLVED CADMIUM CONCENTRATION IS BELOW THE RAO
- (TURBID) SAMPLE HAD HIGH TURBIDITY MEASURED IN FIELD
- (NS) NOT SAMPLED
-  CADMIUM CONCENTRATION, 2100 PPB
-  CADMIUM CONCENTRATION, 4 PPB AND <100 PPB

0 200 400
SCALE IN FEET



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818 Chesapeake Ave.
Annapolis, MD 21403
410-288-2765

Drafter: M. Hickey

Approved By: J.D. Ferris

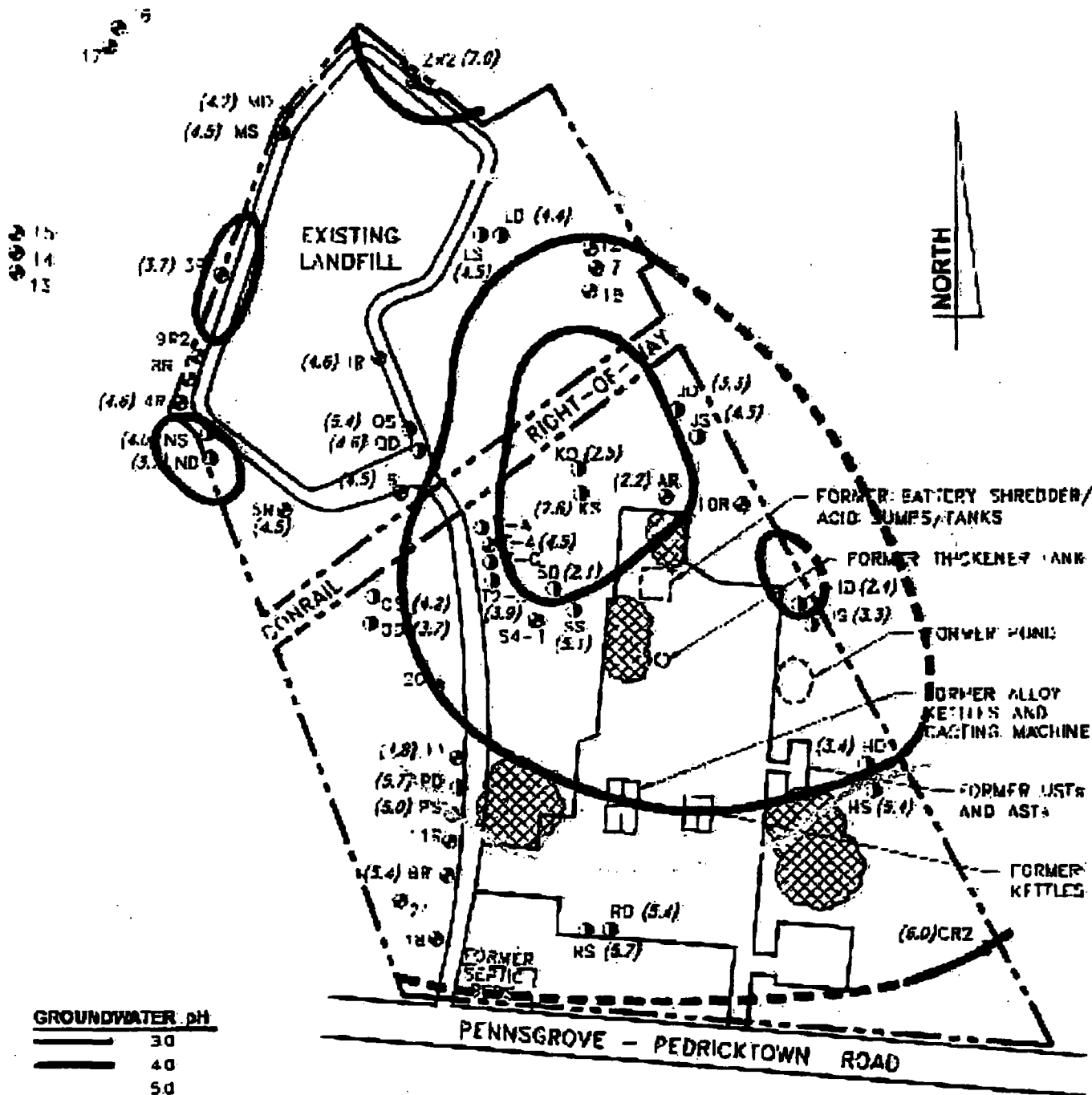
Prepared: 2/2/2011

Total Cd Distribution - Deep Zone
November 2010

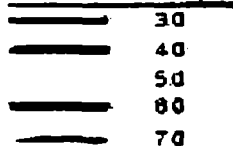
NL Industries, Inc. Superfund Site
Piedmont, NJ

FIGURE

8



GROUNDWATER pH



LEGEND

- ① RD 2" WELL (NESTED PAIR) & DESIGNATION
- ⊙ CRZ 4" WELL & DESIGNATION
- (4.5) GROUNDWATER pH
- FORMER SLAG PILE LOCATION

NOTE: GROUNDWATER pH CONTOURS SHOWN ARE A REPRESENTATIVE COMPOSITE OF DATA FROM SHALLOW AND DEEP WELLS IN THE UNCONFINED AQUIFER



pH of Groundwater - 1983

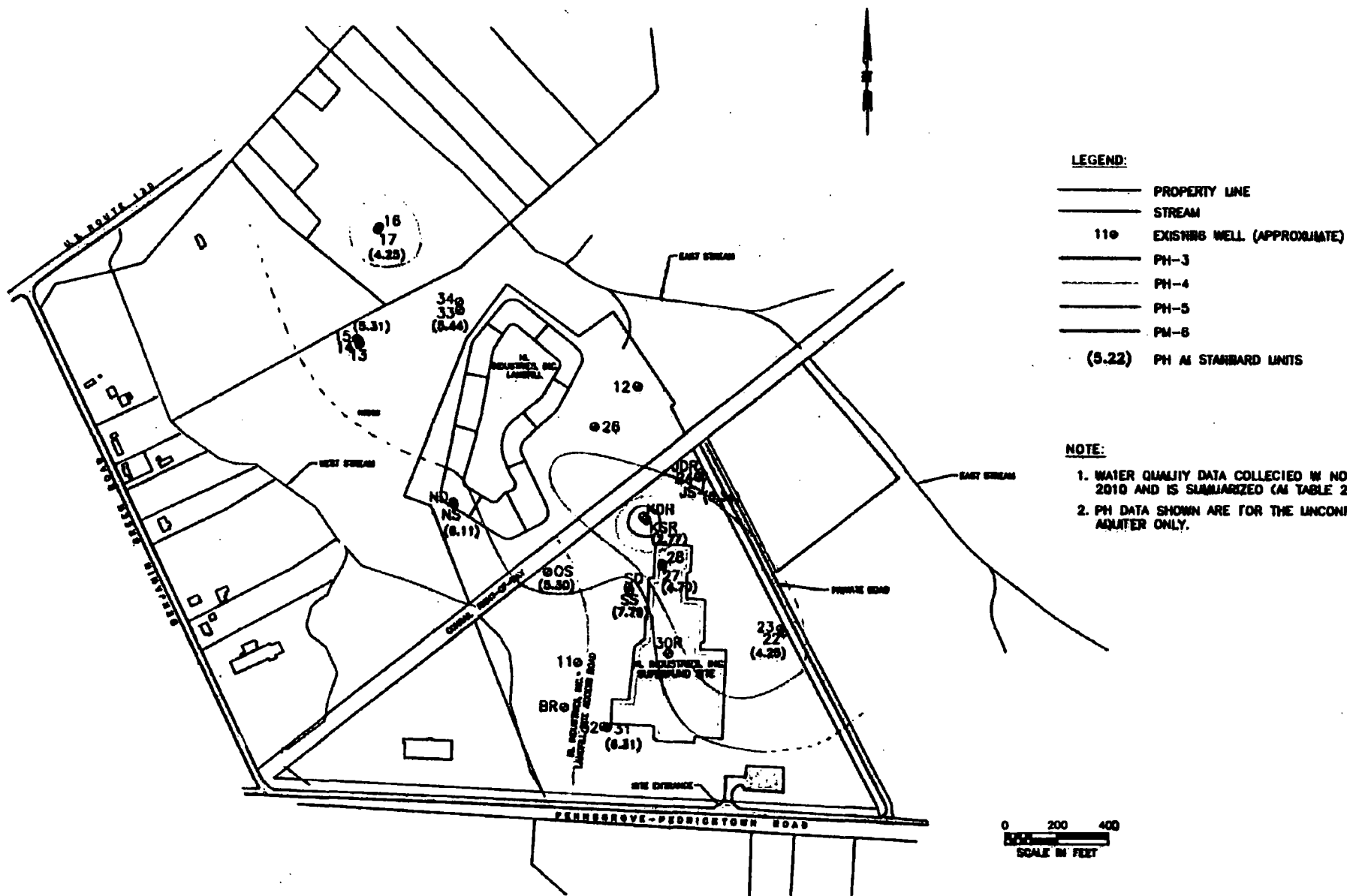
NL Industries Site
Pedricktown, New Jersey



GEOSYNTEC CONSULTANTS

COLUMBIA, MARYLAND

Figure 9



CSI Environmental, LLC

818 Chesapeake Ave.
Annapolis, MD 21403
410-265-2785

Drafter: M. Hickey

Approved By: J.D. Ferris

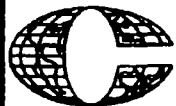
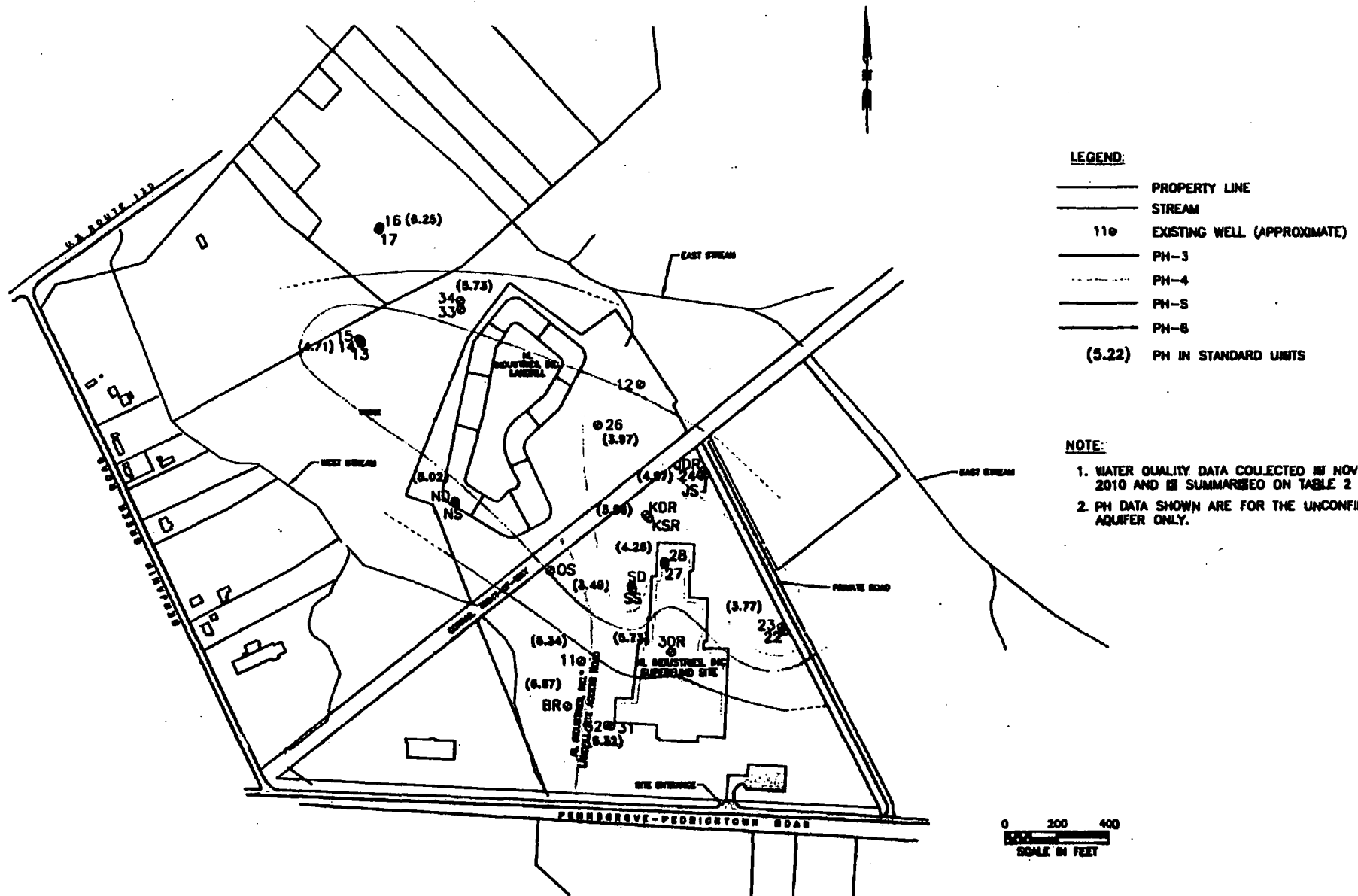
Last Revised: 12/21/2010

Groundwater pH Distribution - Shallow Zone
November 2010

NL Industries, Inc. Superfund Site
Pedricktown, NJ

FIGURE

10



CSI Environmental, LLC

816 Chesapeake Ave.
Annapolis, MD 21403
410-258-2705

Drafter: M. Hickey

Approved By: J.D. Ferris

Last Revised: 12/21/2010

Groundwater pH Distribution - Deep Zone

November 2010

NL Industries, Inc. Superfund Site
Pedricktown, NJ

FIGURE

11

APPENDIX II - TABLES

Table 1 – Chemicals of Concern (COCs) for Groundwater¹

Chemical of Concern	Higher of the NJGWQS and the PQL³ (ppb)	Federal MCL (ppb)
Arsenic	3	10
Beryllium	1	4
Cadmium²	4	5
Lead	5	15⁴
1,1-dichloroethane	50	
1,1-dichloroethylene	1	7
Tetrachloroethene	1	5
Vinyl chloride	1	2

1 – The list of COCs includes those identified in Table A of the 1994 ROD. These COCs were identified for the purpose of assessing risk at the NL Site. For any listed contaminant, the most stringent of the NJGWQS/PQL and the Federal MCL applies.

2 – Cadmium was later added as a groundwater COC.

3 – The values represent the higher of the New Jersey Groundwater Quality Standards (NJGWQS) and the Practical Quantitation Levels (PQL)

4 – Action level for lead

Table 2
Monitoring Well Construction Details
NL Industries Superfund Site
Pedricktown, New Jersey

Monitoring Well	Casing Diameter	Well Depth ⁽¹⁾	Top Screen ⁽²⁾	Bottom Screen ⁽²⁾	Top of Casing Elevation ⁽³⁾	Top Screen Elevation	Bottom Screen Elevation	Depth To Water m	Groundwater Elevation	Aquifer Zona ⁽⁵⁾
24	2	73	68	73	13.13	-64.87	-59.87	12.22	0.91	FCA
12	4	78.2	58.2	78.2	11.79	-46.41	-66.41	10.79	1.00	FCA
13	4	115.7	95.7	115.7	11.59	-84.11	-104.11	11.62	-0.00	SCA
16	4	56.8	36.8	56.8	10.79	-26.01	-46.01	7.50	3.29	UA - Deep
11	4	54.1	34.1	54.1	9.72	-24.38	-44.38	4.68	5.04	UA - Deep
BR	4	39	33	39	9.74	-23.26	-29.26	5.60	4.14	UA - Deep
14	4	48.6	28.6	46.6	11.39	-15.21	-35.21	6.64	4.75	UA - Deep
23	2	24	24	34	14	-10	-20	8.54	5.46	UA - Deep
28	2	30	20	30	13.98	-6.02	-16.02	8.37	5.61	UA - Deep
32	2	30	20	30	14.22	-5.78	-15.78	8.82	5.40	UA - Deep
SO	2	29.4	17.4	29.4	12.33	-5.07	-17.07	6.00	5.43	UA - Deep
KDR	2	24	14	24	9.47	-4.53	-14.53	3.85	5.62	UA - Deep
30R	2	28.71	17	27	12.81	-4.19	-14.19	7.32	5.49	UA - Deep
JOR	2	27.26	17	27	13.01	-3.99	-13.99	7.37	5.64	UA - Deep
34	2	20	10	20	8.55	-3.45	-13.45	3.23	3.32	UA - Deep
NO	2	24	14	24	11.22	-2.78	-12.78	7.10	4.12	UA - Deep
26	2	22	12	22	11.86	-0.14	-10.14	6.53	5.33	UA - Deep
17	4	23	8.0	23	9.31	1.31	-13.69	4.60	4.71	UA - Shallow
15	4	25	10.0	25	11.32	1.32	-13.68	6.51	4.81	UA - Shallow
33	2	10	5	10	6.67	1.67	-3.33	3.39	3.28	UA - Shallow
22	2	16	11	16	14.18	3.16	-1.84	8.75	5.41	UA - Shallow
KSR	2	1S	5	15	0.53	4.53	-5.47	3.96	5.57	UA - Shallow
SS	2	16.4	6.4	16.4	11.64	5.24	-4.76	6.17	5.47	UA - Shallow
OS	2	21.3	6.3	21.3	11.82	5.52	-9.48	6.77	5.05	UA - Shallow
NS	2	16.5	6.5	16.5	12.17	5.67	-4.33	7.91	4.26	UA - Shallow
JS	2	15.37	5	15	12.95	7.95	-2.05	7.31	5.64	UA - Shallow
27	2	1S	5	15	13.49	8.49	-1.51	7.88	5.63	UA - Shallow
31	2	15	5	1S	14.27	9.27	-0.73	6.56	7.71	UA - Shallow

Notes:

- ⁽¹⁾ Depth to bottom of well in feet below top of casing (TOC).
⁽²⁾ Screened interval of well in feet below ground surface.
⁽³⁾ TOC elevation in feet above mean sea level.
⁽⁴⁾ Depth to water in feet below TOC, measured in November 2010.
⁽⁵⁾ UA = Unconfined Aquifer, FCA = First Confined Aquifer, SCA = Second Confined Aquifer.

APPENDIX III – RESPONSIVENESS SUMMARY

APPENDIX III

RESPONSIVENESS SUMMARY

NL Industries, Inc. Superfund Site

INTRODUCTION

As required by Superfund policy, this Responsiveness Summary provides a summary of the citizens' comments and concerns regarding the Proposed Plan for the NL Industries, Inc. (NL) Superfund Site (Site), and the U.S. Environmental Protection Agency's (EPA's) responses to those comments and concerns. At the time of the public comment period, EPA presented a proposed change to the groundwater remedy selected in the July 8, 1994 Record of Decision (ROD) for the NL Site, which is located in Pedricktown, Salem County, New Jersey. The groundwater remedy is the only component of Operable Unit I (OUI) which will be modified. All comments summarized in this document have been considered in EPA's final decision for selection of a remedial alternative for the OUI groundwater remedy.

This Responsiveness Summary is divided into the following sections:

- I. **BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS:** This section provides the history of community involvement and concerns regarding the NL Site.
- II. **COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES:** This section includes summaries of oral comments received by EPA at the July 7, 2011 public meeting, EPA's responses to these comments, as well as responses to written comments received during the public comment period.

The Responsiveness Summary includes attachments which document public participation in the remedy selection process for the CLTL Site. The attachments are as follows:

- Attachment A – July 2011 Proposed Plan for the NL Site;
- Attachment B – Public Notice published in Today's Sunbeam;
- Attachment C – July 7, 2011 Public Meeting Attendance Sheet; and
- Attachment D – Transcript of the July 7, 2011 Public Meeting.

I. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

EPA's Proposed Plan for the OUI groundwater remedial action was released to the public on June 22, 2011. A copy of the Proposed Plan, Focused Feasibility Study for Groundwater Remediation (FFS) and other documents which comprise the administrative record file were made available to the public in the information repository located at the Penns Grove Public Library as well as the EPA Region 2's Record Center. A public notice was published in Today's Sunbeam, a Salem County newspaper, on June 22, 2011, advising the public of the availability of the Proposed Plan. This notice also announced the opening of a 30-day public comment period, from June 22, 2011 to July 21, 2011, and invited the interested parties to attend an upcoming public meeting. This public meeting, during which EPA presented the preferred alternative for the OUI groundwater remedy, answered questions regarding the NL Site, and accepted verbal comments regarding the Proposed Plan, was held on July 7, 2011 at the Oldmans Township School located at 10 Freed Road, Pedricktown, New Jersey.

II. COMPREHENSIVE SUMMARY OF MAJOR QUESTIONS, COMMENTS, CONCERNS AND RESPONSES

Part 1: Verbal Comments

Comment #1: A citizen was concerned that the landfill, located adjacent to the former facility area of the NL Site, is acting as a source to groundwater contamination.

EPA Response: The landfill was closed under New Jersey State authority prior to the listing of the NL Industries Inc. Superfund Site on the National Priorities List. The landfill is not part of the Superfund Site. The landfill was capped and has a leachate collection system which means that any contaminants that may leach from the soil beneath the landfill cap do not reach the groundwater. The leachate from the landfill is periodically collected, when the leachate collection tank nears its holding capacity, and is properly disposed of off-site. The landfill and its leachate collection system are maintained by NL Industries and are monitored by the New Jersey Department of Environmental Protection. Based on groundwater monitoring data, EPA does not believe that the landfill is acting as a source to groundwater contamination. There are currently 28 groundwater monitoring wells on the NL Site. Groundwater monitoring has been conducted periodically since the 1980's. While lead and cadmium remain at levels above the New Jersey Groundwater Quality Standards, there has been a trend of decreasing contaminant concentrations over time. If the landfill continued to act as a source to groundwater contamination, the contaminant concentrations would not decrease over time.

Comment #2: A citizen was concerned that contaminated soil was not excavated.

EPA Response: A Remedial Investigation (RI) was conducted for the NL Site to determine the nature and extent of contamination. Areas identified as having greater than

500 parts per million (ppm) of lead in the soil or sediment were required to be excavated. The excavation of these contaminated soils and sediment was conducted in phases, known as Operable Units (OUs). Soil and sediment containing greater than 500 ppm of lead were removed from the former facility area, portions of the East Stream and West Stream and portions of the U.S. Army Corps of Engineers Channel located north of Route 130. After excavation of the contaminated portions was completed, confirmatory sampling was done to ensure that further excavation was not required.

Comment #3: A citizen wanted to know how far out from the current groundwater plume was the groundwater tested and how often is the groundwater monitored.

EPA Response: Groundwater at the NL Site flows in a westerly direction toward the West Stream. Groundwater was sampled around the NL Site and sampling went as far out as necessary until a clean groundwater zone was reached. This is how the nature and extent of groundwater contamination was determined and the contaminant plume was delineated. EPA pointed out the monitoring well network, consisting of 28 monitoring wells, on a figure from the presentation to illustrate the current extent of the groundwater monitoring wells. The figure was also used to demonstrate where the current plume of groundwater contamination exists, beneath the former facility area, based on the most recent groundwater data from 2004, 2007 and 2010. All wells within the well network are sampled during groundwater monitoring events. As part of the groundwater remedy, a schedule of groundwater monitoring would be established to ensure that the plume is not migrating and to collect data on contaminant concentrations.

Comment #4: A citizen asked if the aquifer soils were going to be excavated after the reagent injection process is completed.

EPA Response: The reagent injection remedy will cause the contaminants to adsorb or bind to the aquifer soils. This process removes the contaminants from the groundwater flow and has a high degree of permanence as it would take a very low pH to reverse the reaction. The pH at the NL Site has been rising toward background levels since the source of the contamination has been removed. Accordingly, the aquifer soils do not need to be excavated in order to achieve the cleanup goals.

Comment #5: Citizens asked if reagent injection had been used successfully in other cases and had concerns of the toxicity of the reagent and how it would be injected into the groundwater.

EPA Response: Reagent Injection technology has been selected for use at other sites, such as the Puchack Well Field Superfund Site (Puchack Site). At the Puchack Site, chromium is the contaminant of concern in the groundwater. Treatability studies were done and lactate was identified as the reagent to be used. The treatability study went well and reagent injections are scheduled to begin later this year.

There are some other sites where reagent injection has been used; however, EPA did not provide a detailed list of sites at the time of the meeting. EPA did state that there have

been a number of studies done on the use of reagent injection as well as the use of phosphate reagents. These studies were evaluated in the FFS. The phosphate reagent is not toxic and is not expected to cause further environmental damage. The reagent would be injected into the groundwater via injection wells. EPA reiterated *that while* reagent injection is a proven technology and our data regarding site-specific conditions indicate that it should work at the NL Site, a treatability study will be done at the NL Site. The treatability study will enable us to test the use of the reagent in a small area of the site to collect data and confirm that the technology will work. The treatability study will also aid in the development of the remedial design details.

Note that further detailed information regarding the use of reagent injection is provided in the Written Comments Section, Comments received from the U.S. Army Corps of Engineers (USACE), Philadelphia District regarding the Proposed Plan, Comment #3.

Comment #6: Citizens asked how long the groundwater would be monitored.

EPA Response: The reagent injection remedy will require extensive monitoring before, during and after the remedy implementation. All groundwater monitoring wells in the network will be sampled during the monitoring events and additional wells may be added and monitored as necessary. Once the groundwater cleanup goals have been achieved, groundwater will continue to be monitored for approximately 3 to 10 years, as necessary, to ensure that the remedy remains protective and EPA is satisfied with the results.

Comment #7: A citizen asked if EPA was aware of the sediment and groundwater sampling conducted by the U.S. Army Corps of Engineers.

EPA Response: EPA is aware of the sediment and groundwater sampling conducted by the U.S. Army Corps of Engineers (USACE). The USACE recently installed and sampled a number of groundwater wells in the vicinity of their drainage channel, located north of the NL Site, across from Route 130. The USACE groundwater wells in the vicinity of the NL Site (along Benjamin Green Road and Route 130) confirmed that lead and cadmium were not present at concentrations exceeding drinking water standards. The data supports EPA's observations that the groundwater contamination has not impacted the USACE channel or areas beyond Benjamin Green Road. With respect to the USACE sediment sampling, areas of the drainage channel were reported to have greater than 500 parts per million of lead in the sediment. EPA will further evaluate possible lead contamination and its sources.

Comment #8: A citizen expressed concern over the fact that a groundwater remedy was selected in the 1990's and the citizen believes that no progress has been made toward the cleanup of the groundwater contamination.

EPA Response: The 1994 ROD for OUI selected a remedy for soil, sediment and groundwater. EPA first addressed the areas posing the most immediate public health concerns. This included the cleanup of the contaminated soil and sediment that resulted from facility operations. While the soil and sediment component of the ROD were being

addressed, groundwater continued to be monitored. Remedial activities for the soil and sediment were completed relatively recently and more focus was placed on addressing the groundwater contamination. Given that groundwater continued to be monitored over the years, a significant data set of groundwater monitoring parameters was collected and analyzed. The data, collected as recently as 2010, demonstrated a significant decreasing trend in groundwater concentrations of the contaminants of concern. The groundwater remedy selected in the 1994 OUI ROD called for the extraction and treatment of groundwater which would involve the construction of a treatment plant and was estimated to require approximately 50 years to achieve the groundwater cleanup goals. Given the decreasing trend in contaminant concentrations, alternative groundwater treatment options were explored because there are now other treatment technologies available, such as reagent injection, which can more efficiently treat the amount of groundwater contamination that is currently present at the NL Site. Reagent Injection was determined to be just as effective as the pump and treat technology and it would take significantly less time and money to implement this remedy.

Comment #9: Citizens wanted to know who is paying for the remedy and who is conducting the work.

EPA Response: The NL Site activities have been funded and performed by a group of Potentially Responsible Parties (PRPs), with EPA oversight to date. EPA expects to enter into a legal agreement with the PRPs to implement the groundwater remedy which is the subject of this ROD Amendment. If the PRPs accept the terms of the legal agreement, they will continue to fund and perform the next phase of work at the NL Site and EPA would continue to review the documents and plans prepared by the PRPs and oversee the field activities. The New Jersey Department of Environmental Protection would also participate in the review process. No work would be conducted by the PRPs without approval by EPA.

Comment #10: A citizen questioned whether or not there have been any studies in the area surrounding the NL Site with respect to mortality rates.

EPA Response: EPA is unaware of any health studies conducted specifically in the area around the NL Site. Studies regarding health effects and mortality rates are usually conducted by the state health department or the Agency for Toxic Substances and Disease Registry. EPA conducted a human health risk assessment whereby current and potential future risks from Site contaminants were evaluated. The risk assessment determined that there was a potential future risk due to ingestion of contaminated groundwater. This potential future risk is the reason why remedial actions to restore the groundwater to drinking water standards is required. Currently, groundwater use at the Site is restricted so that no one is currently being exposed to contaminated groundwater.

Comment #11: A citizen asked how there could be groundwater contamination if the remedial actions for the soil and sediment were completed successfully.

EPA Response: During the years in which the NL Industries facility was in operation, slag piles containing lead and other contaminants were dumped and stored on site. Battery crushing operations also released acids into the soil which mobilized contaminants and allowed them to migrate through the soil into the groundwater. Therefore, even though the contaminated soils and sediments, which served as the source of contamination, were removed through previous Superfund remedial actions, contaminants had already migrated into the groundwater. Accordingly, additional remedial actions to address the contaminated groundwater need to be taken.

Comment #12: Citizens asked if the groundwater wells are screened at different levels and at what level was the contamination found.

EPA Response: The groundwater contamination is limited to the unconfined aquifer. Groundwater samples were collected throughout the unconfined aquifer and monitoring well screen depths ranged from 5 feet below ground surface to 50 feet below ground surface.

Comment #13: A citizen asked about the depth at which the soil samples were taken.

EPA Response: The water table at the NL Site is approximately 5 feet below the ground surface. The soil cleanup goal was to remove all soils having greater than 500 ppm of lead. Therefore, soil testing only went as deep as necessary until either clean soil was detected or the water table was reached. Contaminated unsaturated soils having greater than 500 ppm of lead were excavated. Contamination detected below the water table in the unconfined aquifer is the subject of this ROD Amendment.

Comment #14: A citizen was concerned about the pH adjustment portion of the reagent injection remedy. In particular, the citizen asked about the timeframe needed for the pH to rise and the effects on the groundwater if the pH was raised too high.

EPA Response: The implementation of the reagent injection remedy requires that a treatability study be conducted in a small area on-site. The treatability study will help to determine the amount of base needed to adjust the pH to the desired level as well as the number of injection points needed to distribute the base and reagent. The data along with groundwater monitoring will allow us to control the pH to ensure that it is not raised too high. The treatability study may take some time. After analyzing the data from the treatability study, an engineering design will be developed to be applied to the entire Site to fully implement the groundwater remedy.

Comment #15: A citizen, who lives in the vicinity of the NL Site, mentioned that she had to drill a new well on her property and expressed concern over the quality of the groundwater that would come from the new well.

EPA Response: The citizen's property is located a few blocks northeast of the NL Site near the intersection of Route 130 and Railroad Avenue. Site-related contamination has not migrated to the east. NL Site groundwater monitoring has demonstrated that site-

related contamination is primarily located below the former NL facility area. Furthermore, groundwater flow at the NL Site is in a westerly direction toward the West Stream and residential groundwater wells sampled along Route 130, north of the NL Site, have not had exceedances of the New Jersey Groundwater Quality Standards for lead and cadmium, which are the primary contaminants of concern at the site. Therefore, it is highly unlikely that the citizen's groundwater well would be affected by site-related contamination.

Comment #16: Citizens asked how long it would take to implement the groundwater remedy.

EPA Response: It is anticipated that the remedy will be selected approximately in September 2011. After the remedy selection, EPA will work with the Responsible Parties to develop a design or plan for the treatability study. It is likely to take a couple of years to complete the treatability study and another year or so to finalize the subsequent engineering design for the remedy due to the inherent complexities associated with implementing a groundwater remedy. Once the remedial design is finalized and the remedy implemented, it is estimated to take approximately 10 years to reach the groundwater cleanup goals.

Comment #17: Citizens wanted to know how long it would take before the land could be redeveloped and used for purposes other than Superfund cleanup activities and who would make the decision regarding what the land could be used for. There were also concerns regarding ownership of the property and liability issues.

EPA Response: EPA supports appropriate reuse of Superfund Sites as long as they are compatible with the remedy. Since we are not going to be installing a pump and treat plant, there would definitely be an opportunity to reuse the former facility area of the Site prior to achievement of cleanup goals. There are currently groundwater monitoring wells located on-site and additional wells or injection points may need to be installed; however, as long as EPA can maintain access to the wells, there should be no reason why a land reuse plan could not be considered. The main issue with reuse at the NL Site is that someone needs to take ownership of the Site. As EPA understands it, the Site is currently abandoned. Town attorneys can meet with EPA attorneys to discuss potential liability issues in taking ownership to the Superfund Site; however, liability issues can usually be worked out. After the issue of ownership is settled, the Town or whomever owns the property can present a detailed plan for the reuse of the NL Site to EPA. EPA does not decide what the land will be used for; however, EPA needs to be involved in the planning stages to ensure that the reuse plan does not interfere with the on-going remedy.

Comment #18: A citizen was concerned about the frequency of sediment sampling on his property. He wanted to know if extensive sampling was going to be done every year.

EPA Response: The citizen was referring to sediment remediation work that is currently taking place in the West Stream. Large scale sediment sampling will not be taking place on a regular basis. The recent sampling was a result of sediment monitoring that showed

some areas of sediment containing greater than 500 ppm of lead. In order to determine the extent of the lead contamination, a large scale sampling effort along the West Stream was conducted. EPA has identified the extent of areas containing lead above 500 ppm in the sediment and these areas will be excavated during the summer of 2011. After the excavation is complete, confirmatory samples will be taken to ensure that the job has been satisfactorily completed. Once completed, only occasional monitoring will be conducted, which is not likely to be on a large scale.

Part 2: Written Comments

Comments received from the U.S. Army Corps of Engineers (USACE), Philadelphia District regarding the Proposed Plan

Comment #1: Even though this document [Proposed Plan] does not discuss the sediment contamination, it should be noted that recent sampling conducted by USACE Philadelphia District personnel, as well as by our contractor, has shown the presence of sediment contamination in and around the West Stream between Route 130 and the Delaware River (i.e. on USACE property). Both XRF and laboratory chemical tests have shown sediment samples which contain greater than 500 mg/kg of lead.

EPA Response: EPA has received the sampling report from the USACE containing the sediment results and is reviewing the report. EPA expects to discuss the report with the USACE upon completion of our review. Note that the sediment contamination is not the subject of this ROD Amendment. The ROD Amendment relates to the groundwater remedy.

Comment #2: The text states that the goal is to restore the aquifer to its most beneficial use. Does this mean that the goal is to restore the aquifer back to drinking water quality, since this is a Class II aquifer?

EPA Response: Yes. The goal is to restore the aquifer to drinking water quality as it is the most beneficial use.

Comment #3: Are there successful case histories of the use of the proposed Alternative 3 component (Reagent Injection) in applications similar to NL Industries and using the same treatment reagents?

EPA Response: Reagent injection is a general term used to describe a technology whereby a substance is injected into the subsurface or groundwater to treat a specific contaminant or class of contaminants. For the NL Site, the contaminants targeted through reagent injection include lead and cadmium in the unconfined aquifer. A preliminary bench scale treatability study indicated that a phosphate reagent would be successful in removing lead and cadmium from the groundwater. Note that phosphate additives are generally safe and are often food quality grade or certified to the American National Standards Institute (ANSI)/National Sanitation Foundation (NSF) Standard #60 Drinking Water Treatment Chemicals as approved for use in potable drinking water.

Therefore, the use of phosphates to treat contaminated groundwater at the NL Site is not anticipated to result in any adverse effects on the groundwater chemistry or the future use of the groundwater as a drinking water source.

Reagent injection is being used at the Puchack Well Field Superfund Site to address chromium contaminated groundwater. At this site, a pilot study was completed to confirm the success of the selected reagent. The pilot study demonstrated that the reagent worked better than expected in treating the chromium contamination. A pilot study will also be conducted at the NL Site prior to full scale remedy implementation to ensure that the phosphate reagent works as anticipated.

The Nevada Stewart Mine Site is an example where a phosphate reagent was applied to a permeable treatment wall to treat groundwater containing elevated levels of lead and cadmium, among other metals. The phosphate reagent was successful at removing the metals from the contaminated water.

Phosphates have also been successfully used in industrial applications to treat metals contamination in water systems and several research studies have also been conducted and have confirmed the ability of phosphates to immobilize and remove lead and cadmium from groundwater flow.

References of sites and studies discussed above are provided below:

- Puchack Well Field Superfund Site
<http://cumulis.epa.gov/supercpad/cursites/csinfo.cfm?id=0204096>
- Nevada Stewart Mine Site
<http://www.epa.gov/nrmrl/pubs/600r06153/600r06153.pdf>
- Ma QY, Traina SJ, Logan TJ (1993), *In Situ Lead Immobilization by Apatite*. *Environ. Science and Technology*, 27, 1803-1810.
- Dr. Silvano Mignardi (2010). Removal of Toxic Metals from Water and Soil by Phosphate Treatment.
- Wright, Judith (PIMS NW Inc.) and Conca, James (Los Alamos National Laboratory), *Remediation of Groundwater Contaminated with Zn, Pb and Cd using a Permeable Reactive Barrier with Apatite II*, November 2002.

Comment #4: Is there any expectation that the phosphate reagent may be at least partially used up because of demand by other metals that are present in much greater concentration compared to Pb and Cd? For example iron, aluminum, etc? Also is any demand expected from biological growth such as bacteria that may use up the phosphate in the subsurface or in potentially aerated locations such as injection points, wells, etc?

EPA Response: The demand for phosphate by other metals was considered and discussed in the Focused Feasibility Study for Groundwater Contamination (FFS). Generally speaking, precipitation reactions, such as those induced through certain injection reagents including phosphates, tend to react with elements and compounds following a kinetic order of reaction. The order of reaction varies from compound to compound and with the geochemical conditions in which the reagent is applied (e.g., pH and reagent

concentration). For example, when phosphate is injected into groundwater it tends to react with dissolved lead before dissolved cadmium (based upon their individual solubility products). Concentration can have an effect on the order of reaction, but not at the relatively low concentrations of lead and cadmium detected at the Site. Solubility products (K_{sp}) are often useful for predicting reaction sequences among compounds. Smaller solubility products indicate a less soluble compound and one likely to form before a more soluble compound under given conditions. The following K_{sp} values illustrate that lead phosphate is more likely to form first among the compounds listed because it has the lower solubility product.

Aluminum phosphate	$K_{sp} = 6.3 \times 10^{-19}$
Calcium phosphate	$K_{sp} = 1.0 \times 10^{-29}$
Cadmium phosphate	$K_{sp} = 1.0 \times 10^{-31}$
Lead phosphate	$K_{sp} = 1.0 \times 10^{-42}$

These K_{sp} values indicate that lead phosphate is significantly less soluble than cadmium phosphate, calcium phosphate, or aluminum phosphate. Cadmium is included due its presence at elevated concentrations at the Site. Aluminum and calcium are included because they are typically found in groundwater and will have a tendency to consume some of the reagent injected into the subsurface. It is expected that lead and cadmium will react with the phosphates first followed by calcium and aluminum.

The low K_{sp} values also indicate that phosphate would be a good candidate for immobilizing lead and cadmium with minimal consumption from non-target compounds like calcium and aluminum. To determine the appropriate amount of phosphate needed to overcome its consumption by non-target compounds, a reagent demand test will be incorporated into the pilot test. This test is used to assess the impact of phosphate consumption from non-target compounds and help determine an appropriate concentration of the reagent. The demand test incorporated into the pilot study should also be able to provide information regarding demand by biological growth as the test will be conducted in a small area on-site. Therefore, whatever is present in the groundwater at the NL Site, whether it be other metals or biological growth, we should be able to gather site-specific data regarding the amount of reagent needed to effectively achieve the cleanup goals.

Comment #5: Will the pilot study ensure that there is good distribution and monitoring of the reagents that are added to the subsurface to ensure consistent treatment? If so, how would this be accomplished?

EPA Response: The details regarding reagent distribution will be determined by analyzing data obtained from the pilot study as well as the remedial design.

Comment #6: Will the pilot study include a comparison of the reagent-treated area with an untreated control area to generate the performance data?

EPA Response: The work plan for the pilot study will be developed once the ROD Amendment is issued. During the pilot study, groundwater will continue to be monitored at the NL Site for all wells currently in the well network. Therefore, pilot study data will be able to be compared to data collected from areas not included in the pilot study.

Comment #7: Will there be consideration of any impacts of using the in situ phosphate treatment at down-gradient or untreated locations? USACE property is down gradient from the NL site.

EPA Response: As stated in the response to Comment #4, the pilot study will be used to calculate the amount of phosphate reagent needed to achieve the cleanup goals and to limit the potential amount of unreacted reagent. Groundwater will be monitored to collect data on the contaminant levels as well as the reagent concentrations and general groundwater parameters. The phosphate reagent is not anticipated to have negative impacts in the unconfined aquifer.

Comment #8: Will the pilot study determine whether any rebound in soluble Pb, Cd, or other metal concentration may occur after the high pH slug is applied and the groundwater pH stabilizes over time?

EPA Response: The reagent injection remedy will require extensive monitoring before, during and after the remedy implementation. All groundwater monitoring wells in the network will be sampled during the monitoring events and additional wells may be added and monitored as necessary. Once the groundwater cleanup goals have been achieved, groundwater will continue to be monitored for approximately 3 to 10 years, as necessary, to ensure that the remedy remains protective and EPA is satisfied with the results.

Comments received from the Pedricktown Site Group (Group) regarding the Proposed Plan

Comment #1: Reagent Injection - The Group agrees with USEPA that a change to the groundwater remedy selected in the July 1994 Record of Decision is appropriate. For the reasons addressed in the Focused Feasibility Study for Groundwater Remediation (FFS Report) and other documents previously submitted by the Group to USEPA, the Group believes that the USEPA's selection of the reagent injection remedy is appropriate.

EPA Response: EPA acknowledges the Group's comment.

Comment #2: In the July 2011 Proposed Plan, USEPA indicates that: (a) the baseline risk assessment performed in 1990 is still valid; (b) the potential exposure pathways, land use scenarios, and receptors identified in the baseline risk assessment remain applicable at the site; and (c) an unacceptable human health risk remains due to the potential for ingestion of contaminated groundwater at the site. The baseline risk assessment was performed in 1990 as part of the remedial investigation and was based on the concentrations of the contaminants of concern detected in groundwater samples collected at the site in 1989.

The 1990 baseline risk assessment evaluated the potential risks to human health by identifying potential exposure pathways by which the public could be exposed to contaminated groundwater. Potential exposures were assessed for both potential present and future land use scenarios. Current land use in 1990 was considered in the risk assessment to be an industrial facility, and future land use was characterized as either an industrial facility or a residential area. In 1990, current potential receptors included off-site residents (child and adult) and off-site workers. Future potential receptors in 1990 included on-site residents (child and adult), off-site residents (child and adult), on-site workers, and off-site workers. The baseline risk assessment concluded in 1990 that there was the potential for unacceptable risk due to the potential for future ingestion of contaminated groundwater.

The Group believes it is important to note that despite the conclusion in the 1990 risk assessment regarding potential groundwater contamination exposure: (a) there have been no known incidents of human ingestion of contaminated groundwater from the site during the 21 years since the baseline risk assessment was performed; (b) over the years, as a result of removal of contaminated soil and other source materials and through natural attenuation mechanisms, the area of impacted groundwater containing lead and cadmium concentrations above the New Jersey Groundwater Quality Standards (NJGWQSs) has decreased and is now limited to the area shown on Figure 1 of USEPA's Proposed Plan; (c) there is no current, allowed use of on-site groundwater at the site; (d) considering the industrial zoning of the site, there is an extremely low possibility that the site will be used for residential purposes and that on-site groundwater will be used for potable water by residential occupants in the future; (e) considering the industrial zoning of the site and the presence at the site of now inactive piping connections to the municipal water supply, there is an extremely low likelihood that groundwater at the site will be consumed by workers at the industrial site in the future; (f) there is no known off-site migration of contaminated groundwater containing lead and cadmium concentrations above the NJGWQSs to off-site receptors; and (g) even if off-site groundwater contamination occurred, which is unlikely due to the natural attenuation trends that have already been demonstrated, the residents living along Benjamin Green Road are serviced by the municipal water supply, and a groundwater flow divide (referenced in the FFS Report but not referenced in USEPA's Proposed Plan) acts as a hydrogeological barrier to groundwater flow between the site and the business and residences along US Route 130. As a result of the site conditions described above, the Group believes that the 1990 risk assessment significantly overstates the potential current and future risks of exposure to groundwater contamination because the risks of exposure are now significantly lower than they were at the time the risk assessment was performed in 1990.

EPA Response: The unconfined aquifer at the site is classified as a Class II aquifer in the state of New Jersey. The designated use of a Class II aquifer is to provide potable water and this is considered to be the most beneficial use for the aquifer. Accordingly, while the groundwater at the site is not currently being used for drinking water, the goal is to restore the aquifer to its most beneficial use.

A review of the most recent groundwater data reveals that the concentrations of COCs, primarily cadmium and lead, continue to exceed their respective NJDEP Groundwater Quality Criteria and Federal Maximum Contaminant Levels. These standards were promulgated to ensure that public water systems used as potable water sources remain protective of human health by limiting levels of contaminants in the drinking water. The RAO for the Site is to restore the site-related contaminated portions of the unconfined aquifer to drinking water standards for all contaminants; this RAO has not been met for all of the constituents. Therefore, unacceptable human health risk to a potentially exposed population from direct exposure to groundwater remains. The level of "perceived" risk as described by the PRP Group's comment above does not change the fact that a human health risk remains as long as there are exceedances of the drinking water standards. Furthermore, it is important to note that assessments of risk are evaluated in the absence of institutional controls. EPA does not rely on assumptions that water will not be ingested or used in the future as zoning and future site access are not controlled by EPA. The reason why there have been no incidents of ingestion of contaminated groundwater on-site is because use of groundwater at the NL Site is currently not permitted based on the known contamination. A formal Classification Exemption Area will be implemented as part of the remedy to ensure that groundwater use is restricted until cleanup goals are achieved.

Comment #3: USEPA's Proposed Plan indicates that the groundwater contaminants detected in the unconfined aquifer at the site are comprised primarily of lead and cadmium, and volatile organic compounds (VOCs), arsenic, and radiological parameters have also been detected in localized areas at the site. In addition, the Proposed Plan indicates that total VOC concentrations have generally decreased over time via natural attenuation processes, radiological parameters were determined to be naturally occurring and not related to the site, and arsenic was later determined to be related to leachate from the closed landfill at the site. USEPA also noted that subsequent improvements were made to the landfill by NL Industries, thereby eliminating the seeps and the arsenic detections. As part of the Group's investigation of the West Stream at the site as requested by USEPA, the Group has documented the presence of other contaminants at the site that may be attributable to landfill leachate. As USEPA is aware, NL Industries is responsible for operating and maintaining the closed landfill at the site pursuant to an agreement with the New Jersey Department of Environmental Protection (NJDEP), and the Group is not responsible for addressing issues associated with maintenance of the landfill. The Group is aware that NL Industries has submitted a plan to NJDEP to upgrade the cap of the closed landfill (to eliminate an area of settlement where surface water is currently ponding), which is expected to minimize the volume of landfill leachate that is recovered by NL Industries from the closed landfill.

EPA Response: EPA is aware that NL Industries is responsible for the maintenance of the landfill cap and leachate collection system. While recent sediment and shallow groundwater samples have been taken around the perimeter of the landfill, it has yet to be concluded that contaminants are specifically coming from the landfill. Furthermore, if the landfill was acting as a source to the groundwater contamination in the unconfined aquifer, the decreasing trend in COCs that has been observed would not likely be

occurring. If a determination is made that the landfill is contributing to contamination at the Site, the appropriate parties will be called upon to coordinate efforts to correct the problem.

Comment #4: USEPA's Proposed Plan indicates that: (a) the groundwater data collected at the site in 2010 showed that vinyl chloride and tetrachloroethene are the only site-related VOCs detected above the performance standards; (b) the total VOC concentrations have generally decreased over time via natural attenuation processes; and (c) the vinyl chloride and tetrachloroethene concentrations are expected to continue to decrease.

USEPA's Proposed Plan suggests that the remaining VOCs in groundwater are site related. However, in the four monitoring wells where VOCs were detected during the most recent groundwater monitoring event (2010) at the site, the VOCs were detected at concentrations below applicable health-based standards and criteria, with the exception of vinyl chloride. Vinyl chloride was detected in December 2010 at low concentrations of 7.7 µg/l and 6.9 µg/l in the groundwater samples collected from monitoring wells MW-12 and MW-24, respectively, which slightly exceeded the NJGWQS. Monitoring wells MW-12 and MW-24 are screened in the first confined aquifer and are located hydraulically upgradient from impacted areas at the site. As indicated in the FFS Report, the Group believes that the vinyl chloride detected in these wells is from an off-site source(s) based on the groundwater flow direction, the presence of potential nearby sources, and the lack of a detection of related compounds in shallow monitoring wells in areas on the site that could affect the first unconfined aquifer in the vicinity of MW-12 and MW-24.

EPA Response: EPA does not believe that there is sufficient evidence to conclusively state that the VOCs detected on-site are not site-related. Vinyl Chloride and tetrachloroethene are COCs that were identified in the 1994 ROD. Their concentrations are exceeding the groundwater cleanup goals and as the PRP Group is aware, the VOC concentrations are expected to meet the cleanup goals through natural attenuation processes within the timeframe necessary to implement the reagent injection remedy. Accordingly, VOCs are required to be monitored as part of the groundwater remedy along with the other COCs until the groundwater cleanup goals are achieved.

Comment #5: In the Proposed Plan, USEPA indicates that it plans to retain the current groundwater pump and treat remedy as the contingency remedy for the site. However, USEPA has acknowledged in the Proposed Plan that the pump and treat remedy would be the most difficult and costly of the proposed potential remedies to implement. Furthermore, the data previously collected by the Group during an aquifer pump test at the site strongly suggest that a groundwater pump and treat remedy would be incapable of achieving the remedial action objectives. The analysis of data from the Group's aquifer pump test showed that, although the extraction well was installed in the area at the site containing the highest concentrations of lead and cadmium, lead and cadmium were not prevalent in the extracted groundwater. Specifically, the concentrations of lead and cadmium in the extracted groundwater were either below the laboratory limits of detection or, when they were detected, declined rapidly during pumping, thereby

indicating that: (a) removal of significant mass of lead and cadmium from the aquifer is impossible; and (b) implementation of a pump and treat remedy at the site is impractical. The pump and treat remedy, as acknowledged by USEPA in the Proposed Plan, would also require an NPDES permit for the off-site discharge of treated groundwater. If a pump and treat remedy is required, the discharge limits have not been defined and there is no assurance that the pump and treat system (defined by USEPA as precipitation, clarification, and filtration) would be able to meet the discharge requirements.

For these reasons, the Group believes it is not appropriate for USEPA to select pump and treat as the contingency remedy. In the event USEPA believes it is required to select a contingency remedy, the Group believes that the contingency remedy should be selected at a later date after data from the reagent injection remedy are available. In the event USEPA believes it is required to select and define a specific contingency remedy at the present time, the Group believes it would be appropriate to select monitored natural attenuation as the contingency remedy. For the reasons addressed in the FFS Report and as indicated by USEPA in the Proposed Plan, groundwater has already improved over time and will continue to improve over time as a result of the natural attenuation mechanisms already known to be occurring at the site.

EPA Response: EPA agrees that the reagent injection plus institutional controls remedy is anticipated to be successful in achieving the groundwater cleanup goals and will greatly enhance the natural attenuation processes already occurring at the NL Site. Should the pilot study or subsequent groundwater monitoring demonstrate that contaminant concentrations are not continuing to decrease as expected, the previously selected pump and treat remedy will be re-evaluated. EPA believes that the pump and treat remedy can achieve the cleanup goals and could meet discharge requirements; however, it is not expected to be as efficient as the reagent injection.

Comment #6: As indicated above, the Group believes that USEPA's proposed selection of the reagent injection remedy is appropriate. In the Proposed Plan, USEPA indicates that the reagent injection remedy would include continued monitoring of all contaminants of concern initially listed in the July 1994 Record of Decision. Although the Group believes that it is important to perform groundwater monitoring to confirm the effectiveness of the reagent injection remedy, the Group believes it is not necessary to resume monitoring for parameters that are not site related, for parameters that have already been shown to meet the performance standards, and for parameters that have not been detected during recent groundwater monitoring activities.

EPA Response: Continued monitoring of all COCs, and additional parameters as deemed necessary, is required to ensure that the contaminated unconfined aquifer is restored to drinking water standards and to ensure that drinking water standards are maintained for a period of time even beyond the achievement of the cleanup goals. Reagent injection will alter the groundwater chemistry and groundwater monitoring of all COCs is necessary to ensure that the remedy does not adversely affect the aquifer and result in unexpected mobilization of contaminants.

Comments received by EPA via e-mail

Comment #1 : Several citizens requested copies of documents contained in the Administrative Record for the NL Site.

EPA Response: EPA provided the documents electronically, where appropriate. If the document was not able to be sent electronically, the citizens were directed to either submit a Freedom of Information Act Request or visit one of the site repositories to view the documents.

Comment #2: A citizen asked what the reagent was for the reagent injection remedy.

EPA Response: A Bench Scale Treatability Study (BSTS) was conducted and included in the Focused Feasibility Study Report for the NL Site to investigate potential reagents. The BSTS indicated that tri-sodium phosphate would be a good candidate for a reagent; however, the final decision regarding the reagent to be used at the Site would be determined in a pilot study to be performed in the remedial design phase of the project.

Comment #3: A citizen wanted to know if a price contractor had been chosen to manage the site. The citizen was interested in a chance to bid on the site work.

EPA Response: The NL Site activities have been funded and performed by a group of Potentially Responsible Parties (PRPs), with EPA oversight to date. EPA expects to enter into a legal agreement with the PRPs to implement the groundwater remedy which is the subject of this ROD Amendment. If the PRPs accept the terms of the legal agreement, they will continue to fund and perform the next phase of work at the NL Site and EPA would not expect to control the hiring of contractors for work at the Site. Rather, EPA would continue to review the documents and plans prepared by the PRPs and oversee the field activities and the PRPs would control the hiring of contractors.

Attachment A

July 2011 Proposed Plan for the NL Site

Superfund Program Proposed Plan

*NL Industries, Inc. Superfund Site
July 2011*

U.S. Environmental Protection Agency, Region 2

EPA ANNOUNCES PROPOSED PLAN

This Proposed Plan identifies the U.S. Environmental Protection Agency's (EPA's) proposed change to the groundwater remedy selected in the July 8, 1994 Record of Decision (ROD) for the NL Industries Inc., Superfund Site (Site), in Pedricktown, Salem County, New Jersey. This document is issued by EPA, the lead agency for Site activities, and the New Jersey Department of Environmental Protection (NJDEP), the support agency. EPA, in consultation with NJDEP, will select the final remedy for the Site, documented in a Record of Decision Amendment, after reviewing and considering all information submitted during a 30-day public comment period. EPA, in consultation with NJDEP, may modify the preferred alternative or select another action presented in this Proposed Plan based on new information or public comments. Therefore, the public is encouraged to review and comment on all the alternatives presented in this document.

EPA is addressing the cleanup of the entire Site in two phases, called Operable Units. This Proposed Plan is for the groundwater component of Operable Unit 1 (OU1). OU1 addresses surface water, soils, stream sediments, and groundwater. The cleanup activities for the surface water, soils and stream sediments were completed in 2003. Operable Unit 2 (OU2) was completed in 1995 and addressed slag and lead oxide piles, contaminated surfaces and debris, and contaminated standing water. The OU1 surface water, soils and stream sediments along with OU2, are not the subject of this Proposed Plan.

As part of the OU1 ROD, EPA selected an extraction and treatment system to treat groundwater on-site from the unconfined aquifer and to discharge the treated groundwater to the Delaware River. The primary contaminants of concern in the groundwater are lead and cadmium. The treatment process for the pump and treat system was to include precipitation, clarification, and filtration. To date, the groundwater portion of the remedy has not been implemented.

During the OU1 cleanup activities for surface water, soils and stream sediments, groundwater continued to be monitored to ensure it was not impacting the drinking

water of private residences and to evaluate the status of the contaminant plume. After the removal of the contaminated source material, it was noted that groundwater quality continued to improve over time. Accordingly, cleanup techniques, other than the pump and treat technology were evaluated for use at the Site.

This Proposed Plan describes the groundwater portion of the remedy that was initially selected in the 1994 OU1 ROD and explains why other remedial technologies are now being considered to address Site groundwater contamination. EPA's preferred groundwater remedy involves the injection of a reagent into the groundwater that will expedite and facilitate the precipitation of metal compounds (including lead and cadmium) and remove the contaminants from groundwater through adsorption to aquifer materials.

MARK YOUR CALENDAR

PUBLIC COMMENT PERIOD:

June 22, 2011 – July 21, 2011

EPA will accept written comments on the Proposed Plan during the public comment period.

PUBLIC MEETING: July 7, 2011

EPA will hold a public meeting to explain the Proposed Plan and all of the alternatives presented in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held in the cafeteria of the Oldmans Township School, 10 Freed Road, Pedricktown, New Jersey at 6:30 pm.

For more information, see the Administrative Record at the following locations:

U.S. EPA Records Center, Region 2
290 Broadway, 18th Floor.
New York, New York 10007-1866
(212) 637-4308

Hours: Monday-Friday - 9 am to 5 p.m., by appointment.

Penns Grove Public Library,
222 South Broad Street,
Penns Grove, New Jersey 08069
(856) 299-4255
<http://www.pgcplibrary.org/>

EPA is issuing this Proposed Plan as part of its community

relations program under Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, or Superfund). This Proposed Plan summarizes information that can be found in greater detail in the OU1 Focused Feasibility Study for Groundwater Remediation (FFS) report as well as in other documents contained in the Administrative Record for this Site (see box on previous page).

SITE DESCRIPTION

The Site is located to the north of the Pennsgrove-Pedricktown Road, in Pedricktown, Oldmans Township, Salem County, New Jersey. It is bisected by an active railroad. Approximately 16 acres are located north of the railroad tracks, including a closed 5.6-acre landfill that is not part of the Superfund Site. The southern 28 acres contain the former industrial area and the landfill access road. NL Industries maintains the landfill area and operates the landfill's leachate collection system with NJDEP oversight. The West and East Streams, parts of which are intermittent tributaries of the Delaware River, border and receive surface runoff from the Site. Wetland areas are located along the West Stream. Industrial properties are located east of the former NL Industries process area. U.S. Route 130 is located north of the Site. Several residential properties are located along Route 130 and adjacent to and west of the West Stream. Other properties in the general vicinity of the Site are used for commercial, residential, agricultural, and military purposes (See Figure 1).

SITE HISTORY

Between 1972 and 1984, NL Industries, Inc. and subsequently National Smelting of New Jersey (NSNJ), conducted secondary lead smelting and lead-acid battery reclamation operations. As a result of these operations, soil at the Site was contaminated with metals, primarily lead. In addition, elevated levels of lead, copper and zinc were detected in stream sediment and surface water. Groundwater contamination detected at the Site consisted primarily of lead and cadmium, with localized areas of elevated levels of volatile organic compounds (VOCs).

The Site was listed on the National Priorities List (NPL) in 1983 and a remedial investigation (RI) and feasibility study (FS) were conducted between 1986 and 1993. Between 1989 and 1996, EPA conducted multi-phased cleanup activities at the Site to address immediate public health concerns. Activities included, but were not limited to, the construction of security fences, encapsulation of slag (byproduct of smelting operations) piles, removal of toxic materials, demolition of

buildings, and removal of the most highly contaminated stream sediments.

EPA divided the Site into two Operable Units to facilitate remedial activities. A ROD for OU2 was issued by EPA in 1991 and addressed slag and lead oxide piles, contaminated surfaces and debris, and contaminated standing water. OU2 activities were initiated in 1992 and included off-site reclamation of lead-containing materials, solidification/stabilization and off-site disposal of slag and other materials, decontamination of building floors and surfaces, off-site treatment and disposal of contaminated standing water, building demolition, and environmental monitoring. The OU2 activities were completed in September 1995.

The ROD for OU1 was signed in 1994 and addressed the remediation of soil, groundwater, surface water, and stream sediment. OU1 activities for the soil and stream sediment were initiated in January 2000. Remedial Action Objectives (RAOs) for OU1 included the following: 1) to leave no greater than 500 parts per million (ppm) of lead remaining in site soils and stream sediments; and 2) to restore the contaminated unconfined aquifer to drinking water standards for all contaminants. Established cleanup standards for each contaminant of concern (COC) for groundwater were listed in the ROD. To date, the groundwater portion of the remedy has not been implemented while the surface water and soils source removals were performed. Note that an Explanation of Significant Differences (ESD) was issued in 1999 and pertained to the soil/sediment portion of the remedy selected in the 1994 ROD. The ESD documented the change from disposing of excavated soil/sediment in an on-site landfill to the disposal of excavated soil/sediment to an off-site landfill.

OU1 Soil/Sediment Activities

Remedial activities included the excavation of soil and sediment containing greater than 500 ppm of lead, as stated in the OU1 RAOs. The soil and sediment remedial activities for OU1 were completed in July 2003 and a biological monitoring plan was initiated. Recent sampling showed that there are lead levels in the sediment above the cleanup standards in a portion of the West Stream between Pennsgrove-Pedricktown Road and Route 130. This contaminated sediment will require additional remediation, which is scheduled for the summer of 2011. The soil/sediment activities are not the subject of this Proposed Plan and will therefore not be discussed in further detail.

OU1 Groundwater Activities

OU1 groundwater monitoring was initially conducted during the RI in 1988 and 1989. Site-related contaminants were detected in the groundwater of the unconfined

aquifer at the Site during the RI and the data indicated that the contamination in groundwater was limited to the unconfined aquifer. The contaminants detected in the unconfined aquifer were comprised primarily of lead and cadmium; however, VOCs, arsenic and radiological parameters were also detected in localized areas of the Site. Arsenic was later determined to be related to landfill leachate. Subsequent improvements were made to the landfill, eliminating the seeps and the arsenic detections.

As part of the remedial design (RD), two phases of groundwater evaluations were conducted. Phase I was conducted in 1997. Twenty groundwater samples were collected and analyzed for VOCs, semi-volatile organic compounds (SVOCs), total and dissolved metals, cyanide and radiological parameters. Water quality parameters, such as pH and oxidation-reduction potential, were also monitored. Phase I sampling identified the relationship between pH and metal solubility in groundwater. Low groundwater pH was correlated with higher concentrations of lead and cadmium. The Phase I sampling also indicated that concentrations of COCs in groundwater at the Site had decreased since the late 1980's when the RI was conducted.

The Phase II groundwater evaluation was initiated in 1998 and included installation of additional monitoring wells, sampling of potable groundwater from residential wells along Route 130, aquifer testing, evaluation of the capture zone of groundwater extraction wells, geochemical evaluation of Site subsurface soils, and groundwater flow and transport modeling. As a result of Phase II analysis, radiological parameters were determined to be naturally occurring and not related to the Site and therefore required no further analysis. Aquifer testing revealed that there were adequate amounts of iron and manganese oxide/hydroxide coatings in the aquifer soils to provide adsorption capacity for lead and cadmium that is anticipated to precipitate out of groundwater or otherwise adsorb onto soil at the Site. Pump tests indicated that constant pumping of the contaminated groundwater was not highly efficient at removing lead and cadmium. It was calculated that it would take between 50 and 60 years of aggressive pumping to remove lead and cadmium from the groundwater and achieve cleanup standards. Furthermore, Phase II testing continued to show a decrease in the mass of lead and cadmium remaining in the groundwater.

The decreased contaminant concentrations observed in the Phase I and Phase II groundwater evaluations, as well the availability of newer remedial technologies, prompted the investigation into other potential

groundwater remedies that may be more efficient than the pump and treat alternative selected in the 1994 OUI ROD.

PRINCIPAL THREATS

The term "principal threat" waste usually applies to materials that are acting as a source of contamination. This Proposed Plan addresses groundwater contamination. Contaminated groundwater generally is not considered to be a source material and is therefore not categorized as a "principal threat."

WHAT IS A "PRINCIPAL THREAT"?

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable (NCP Section 300.430(a)(1)(iii)(A)). The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site. A source material is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. Contaminated ground water generally is not considered to be a source material; however, Non-Aqueous Phase Liquids (NAPLs) in ground water may be viewed as source material. Principal threat wastes are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. The decision to treat these wastes is made on a site-specific basis through a detailed analysis of the alternatives using the nine remedy selection criteria. This analysis provides a basis for making a statutory finding that the remedy employs treatment as a principal element.

SITE CHARACTERISTICS

Groundwater contamination is limited to the unconfined aquifer which is part of the Cape May Formation and averages approximately 20 feet in thickness. The unconfined aquifer has historically been subdivided into two zones, the shallow and deep zones, which are screened between approximately 5 feet and 50 feet below grade. The terms shallow and deep relate to screened intervals of monitoring wells and not to geologic materials.

Groundwater flow direction in the unconfined aquifer, as inferred based on groundwater elevation data, is primarily west across the Site towards the West Stream. The groundwater flow rate is approximately 27.5 feet per year; however, contaminants do not flow at this rate since other reactions, such as adsorption, limit the mobility of lead and cadmium, which are the primary COCs.

In addition to groundwater sampling in the 1980's and 1990's, groundwater monitoring was conducted in 2004, 2007 and 2010. Data from all groundwater monitoring events indicate that the lead and cadmium concentrations have generally decreased over time and that the majority of the contaminated groundwater is located beneath the former facility area. Significant migration of contaminants has not been observed in recent sampling events. Between 1983 and 2010, the mass of lead in the

groundwater decreased from approximately 220 pounds to 2.7 pounds. For cadmium, the mass has decreased from approximately 70 pounds in 1988 to 5.9 pounds in 2010. The current volume of groundwater impacted by lead is approximately 1.5 million gallons and 11.8 million gallons for cadmium.

Residential groundwater sampling was also conducted in 2004, 2006, 2007 and 2010 for those residences located north of the Site along Route 130. During each of these monitoring events, lead and cadmium concentrations in the residential water samples were either not detected, were significantly below the applicable New Jersey drinking water standards, or had minor detections believed to be a result of plumbing issues as opposed to site-related contaminant detections.

Removal of contaminated source material, as a result of OU1 soil/sediment and OU2 activities, has resulted in the observed significant decrease in lead and cadmium groundwater concentrations. It has also allowed for pH values to begin equilibrating. The increasing pH values can also account for the continued decrease in lead and cadmium concentrations in groundwater. At low pH, metals are more soluble and tend to stay in solution. At higher pH values, the metals tend to adsorb to the aquifer soils. Oxidation-Reduction potential (Eh) also contributes to metal solubility.

While lead and cadmium have significantly decreased over time, the concentrations still exceed the current drinking water standards.

VOCs have historically been detected at the Site in localized areas. Total VOC concentrations have generally decreased over time via natural attenuation processes and these concentrations are expected to continue to decrease. Groundwater data collected in 2010 indicate that vinyl chloride and tetrachloroethene are the only site-related VOCs detected above the drinking water standards. Further, these two contaminants have been detected at only three of the twenty-eight groundwater monitoring wells at concentrations slightly exceeding the drinking water standards. All COCs initially listed in the ROD, including vinyl chloride, will continue to be monitored to ensure that cleanup levels are achieved.

SCOPE AND ROLE OF THIS ACTION

This is a proposed amendment to the July 8, 1994 ROD for the NL Industries, Inc. Superfund Site. The 1994 ROD selected extraction and treatment of groundwater to address the threats posed by contaminated groundwater in the unconfined aquifer. However, groundwater monitoring data, including the most recent

December 2010 data, indicate that the concentrations of COCs have significantly decreased over time and new technologies for remediation of contaminated groundwater have been developed, leading EPA to investigate alternative groundwater remedies that may be more efficient than extraction and treatment to address the remaining contaminated groundwater.

A summary of the investigated alternative remedies is presented below along with an assessment of EPA's preferred alternative.

SUMMARY OF OPERABLE UNIT 1 RISKS

The purpose of the risk assessment is to identify potential cancer risks and non-cancer health hazards at the Site assuming that no further remedial action is taken. A baseline risk assessment was conducted as part of the RI (O'Brien and Gere, 1990) and was based on COC concentrations from groundwater samples collected in 1989. The baseline risk assessment addressed the potential risks to human health by identifying potential exposure pathways by which the public may be exposed to contaminated groundwater (via ingestion). Groundwater exposures were assessed for both potential present and future land-use scenarios. Current land use was considered to be an industrial facility and future land use was characterized as either an industrial facility or residential area in the risk assessment. Current receptors included off-site residents (child and adult) and off-site workers. Future receptors included on-site residents (child and adult), off-site residents (child and adult), on-site workers and off-site workers. Results of the quantitative risk assessment concluded that there was an unacceptable risk for the potential future receptors due to exposure to contaminated groundwater via ingestion, with the exception of the on-site worker. The potential exposure pathways, land-use scenarios and receptors identified in the 1990 risk assessment remain applicable for the Site; therefore, the original risk assessment is still valid. An ecological risk assessment was also conducted in 1992. It was determined that the two media potentially posing a risk to ecological receptors were the stream sediment and wetland soils. Groundwater was not found to be posing a significant ecological risk.

The unconfined aquifer at the site is classified as a Class II aquifer in the state of New Jersey. The designated use of Class II groundwaters is to provide potable water and this is considered to be the most beneficial use for the aquifer. Accordingly, while the groundwater at the site is not currently being used for drinking water, the goal is to restore the aquifer to its most beneficial use.

A review of the most recent groundwater data reveals that the concentrations of COCs, primarily cadmium and lead,

continue to exceed their respective NJDEP Groundwater Quality Criteria and Federal Maximum Contaminant Levels. These standards were promulgated to ensure that public water systems used as potable water sources remain protective of human health by limiting levels of contaminants in the drinking water. The RAO for the Site is to restore the site-related contaminated portions of the unconfined aquifer to drinking water standards for all contaminants; this RAO has not yet been met for all of the constituents. Therefore, unacceptable human health risk to a potentially exposed population from direct exposure to groundwater remains. It is EPA's current judgment that a remedy is required to restore groundwater and achieve the RAOs, and is necessary in order to protect human health and the environment.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are specific goals to protect human health and the environment. These objectives are based on available information and standards, such as applicable or relevant and appropriate requirements (ARARs), to-be-considered guidance, and site-specific risk-based levels.

The following RAOs have been identified for groundwater at the Site:

- Restore the contaminated unconfined aquifer to drinking water standards for all contaminants;
- Minimize the potential for migration of contaminants of concern in groundwater; and
- Prevent or minimize potential future human exposures, including ingestion of groundwater, which presents an unacceptable risk to public health and the environment.

The cleanup of groundwater at this Site is primarily based on the remediation of lead and cadmium, which are the primary contaminants of concern, to concentrations that meet established drinking water standards. The risk should be eliminated by meeting the most stringent of the Federal Maximum Contaminant Levels (MCLs), the New Jersey MCLs and the New Jersey Groundwater Quality Standards (NJGWQS) for all contaminants of concern. For lead and cadmium, the most stringent standards are the NJGWQS which are 5 parts per billion (ppb) and 4 ppb, respectively.

SUMMARY OF REMEDIAL ALTERNATIVES

Potential applicable technologies were identified and screened using effectiveness, implementability and cost as the criteria, with emphasis on the effectiveness of the

remedial action. Those technologies that passed the initial screening were then assembled into four remedial alternatives.

The time frames below for construction do not include the time for designing the remedy, nor do they include the time to procure necessary contracts.

Alternative 1 - No Action

The No Action alternative was retained for comparison purposes as required by the National Oil and Hazardous Substance Pollution Contingency Plan (NCP). Under the No Action Alternative, no remedial actions would be taken to address groundwater contamination. Institutional and engineering controls would not be implemented to restrict the use or access to contaminated groundwater. Furthermore, there would be no monitoring associated with this alternative to evaluate progress toward achieving the RAOs.

Total Capital Cost	\$0
Operation and Maintenance	\$0
Total Present Net Worth	\$0
Timeframe	0 years

Alternative 2 – Monitored Natural Attenuation Plus Institutional Controls

In this alternative, Monitored Natural Attenuation (MNA) involves the reliance on natural attenuation processes to achieve the Site-specific remediation objectives. Natural attenuation processes include biochemical reactions, dispersion, dilution and sorption processes that occur naturally in the subsurface and serve to reduce contaminant levels from groundwater at the Site. Adsorption appears to be the primary mechanism of MNA contributing to decreased contaminant concentrations at the Site. The MNA alternative would also include a monitoring plan to track contaminant concentrations and determine when the cleanup standards have been achieved. Furthermore, this alternative would include the implementation of institutional controls, such as a Classification Exception Area (CEA), to limit access and potential use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Total Capital Cost	\$163,399
Operation and Maintenance	\$1,049,805
Total Present Net Worth	\$1,213,204
Timeframe	>50 years

Alternative 3 – Reagent Injection Plus Institutional Controls

Reagent injection involves the introduction of a reagent into the water table aquifer using injection wells or well points. The reagent injection technique is based on the

fact that metals dissolved or entrained in groundwater may react to form insoluble compounds and precipitate, or otherwise be immobilized by adsorption onto a substrate and/or by incorporating the metal into a molecular structure (intercalation) which may then adsorb or become incorporated into the soil as a complex or precipitate. Based on preliminary bench-scale treatability studies, it appears that phosphate reagents would be highly effective at binding both lead and cadmium in less soluble metal complexes in the groundwater. A more alkaline environment (pH of approximately 8.0 - 9.0) would be created through addition of a basic compound to promote reactions between the native metals and the soil. This increased pH value is not required to be maintained following reagent injection and would return to ambient levels (pH 5.0 - 6.0) over time. The reagent (likely phosphate) would then be introduced to promote intercalation reactions to more permanently remove lead and cadmium from the groundwater. This remedial alternative would also include continued monitoring of all COCs initially listed in the 1994 ROD, including site-related VOCs. The low concentrations of VOCs observed in recent groundwater monitoring data are expected to continue to decrease to acceptable levels via natural attenuation processes.

Effectiveness of this remedial alternative would be assessed by periodic groundwater sampling and analysis to ensure that cleanup goals are achieved for all COCs. This alternative would also include implementation of institutional controls, such as a CEA, to limit access and potential use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Total Capital Cost	\$890,489
Operation and Maintenance	\$684,766
Total Present Net Worth	\$1,575,255
Timeframe	<10 years

Alternative 4 - Pump and Treat Plus Institutional Controls

In this alternative, a well point system would be used to pump contaminated groundwater into a treatment plant which would be constructed on-site. This was the remedy selected in the 1994 ROD and is presented here again for the purpose of comparing this remedy to the other alternatives. The treatment steps initially described in the 1994 ROD included a 250 gallon per minute pump rate and precipitation/flocculation followed by an ion-exchange polishing step. Following treatment, the water would be pumped to the Delaware River and discharged. An effluent outfall would be constructed at the discharge location. The distance from the Site to the Delaware River is approximately 1.5

miles.

Effectiveness of the pump and treat alternative would be assessed by periodic groundwater sampling and analysis. This alternative would also include implementation of institutional controls, such as a CEA, to limit access and potential use of impacted groundwater at the Site. This would protect human health and the environment until cleanup standards are achieved.

Total Capital Cost	\$1,560,298
Operation and Maintenance	\$4,128,108
Total Present Net Worth	\$5,688,406
Timeframe	>50 Years

EVALUATION OF ALTERNATIVES

EPA uses nine evaluation criteria to assess remedial alternatives individually and against each other in order to select a remedy. The criteria are described in the box on the next page. This section of the Proposed Plan profiles the relative performance of each alternative against the nine criteria, noting how it compares to the other options under consideration. A detailed analysis of each of the alternatives is presented in the Focused Feasibility Study for Groundwater Remediation report which can be found in the Administrative Record.

Overall Protection of Human Health and the Environment

Alternative 1 - No Action will not be protective of human health and the environment because this alternative does not include implementation of institutional controls to restrict the use of contaminated groundwater and does not include monitoring to determine when the applicable standards have been met and the RAOs have been achieved. Alternative 2 - MNA Plus Institutional Controls, Alternative 3 - Reagent Injection Plus Institutional Controls and Alternative 4 - Pump and Treat Plus Institutional Controls are all protective of human health and the environment as they all include institutional controls to restrict the use of groundwater until cleanup goals are met, will result in the decrease of site-related contaminants and include a monitoring plan to determine when the RAOs have been achieved. However, Alternatives 2, 3 and 4 are estimated to achieve the cleanup standards in varying lengths of time.

Compliance with Applicable or relevant and Appropriate Requirements (ARARs)

Alternative 1, No Action, would not comply with ARARs since a determination as to whether or not the applicable standards have been met would not be able to be made due to the lack of monitoring. Alternatives 2, 3 and 4 are

THE NINE SUPERFUND EVALUATION CRITERIA

1. **Overall Protectiveness of Human Health and the Environment** evaluates whether and how an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.
3. **Long-term Effectiveness and Permanence** considers the ability of an alternative to maintain protection of human health and the environment over time.
4. **Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment** evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment and the amount of contamination present
5. **Short-term Effectiveness** considers the length of time needed to implement an alternative and the risks the alternative poses to workers, the community, and the environment during implementation.
6. **Implementability** considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
7. **Cost** includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent
8. **State/Support Agency Acceptance** considers whether the State agrees with the EPA's analyses and recommendations, as described in the RI/FS and Proposed Plan.
9. **Community Acceptance** considers whether the local community agrees with EPA's analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

expected to comply with the applicable ARARs including the NJGWQS. Alternative 4 would also comply with New Jersey Pollution Discharge Elimination System (NJPDES) regulations for off-site discharge of treated groundwater to the Delaware River as well as Resource Conservation and Recovery Act (RCRA) regulations for wastes generated from the pump and treat operations.

Long-Term Effectiveness and Permanence

The highest degree of permanence and long-term effectiveness is achieved for those alternatives that result in the greatest removal of contaminants from the Site.

Alternative 1, No Action, does not provide a mechanism to monitor contaminant migration or attenuation; therefore long-term effectiveness and permanence cannot be determined. Alternative 2 - MNA Plus Institutional Controls, Alternative 3-Reagent Injection Plus Institutional Controls and Alternative 4-Pump and Treat Plus Institutional Controls are all expected to mitigate long-term risks from site contaminants; however, Alternative 3 - Reagent Injection Plus Institutional Controls has a higher degree of permanence due to the chemical reaction with the reagent in which the primary contaminants of concern, lead and cadmium, are bound in less soluble metal complexes in the groundwater.

The Alternative 3 reagent injection technology permanently removes cadmium and lead from solution by precipitating them as metal phosphates. The metals are incorporated into a crystalline lattice using the phosphate precipitation process. Metal phosphates are highly insoluble and, it has been suggested, that their low solubility renders metals in metal phosphates non-bioavailable. Over the long-term, it is anticipated that the pH levels in groundwater at the Site will equilibrate to ambient levels, typically between pH 5 and 6. The ambient pH will not cause any significant resolubilization of lead or cadmium after the metals have reacted to form metal phosphate compounds and/or these phosphate compounds have adsorbed to the aquifer materials. Resolubilization is a potential concern with Alternative 2, MNA. If there were to be a scenario where there was a significant shift in pH toward acidic conditions, the pH shift could potentially cause desorption of lead and cadmium from aquifer surfaces. Alternative 4 - Pump and Treat, requires a significantly longer period of time to meet the applicable standards and is therefore not as efficient in removing contaminants as Alternative 3 - Reagent Injection.

Reduction of Toxicity, Mobility, or Volume through Treatment

Groundwater concentrations of site-related contaminants have generally decreased over time, as evidenced through the groundwater monitoring events. Furthermore, there has been minimal migration of the groundwater plume. Alternative 1 - No Action and Alternative 2 - MNA Plus Institutional Controls do not involve active treatment processes and are therefore not discussed for comparison in this criterion. However, note that the No Action and MNA alternatives would not be expected to achieve cleanup goals in a reasonable timeframe. Alternative 3 - Reagent Injection Plus Institutional Controls and Alternative 4 - Pump and Treat Plus Institutional Controls are expected to reduce the toxicity, mobility or volume of contaminants to meet the applicable standards; however,

the Alternatives are estimated to achieve these reductions at different rates.

Alternative 4 – Pump and Treat Plus Institutional Controls is expected to take over 50 years to reduce the contaminant levels to concentrations meeting the applicable standards. Alternative 3 – Reagent Injection Plus Institutional Controls is expected to reduce contaminant levels to concentrations meeting the applicable standards in less than 10 years through active treatment. This increased rate of reduction is due to the mechanisms in which the primary contaminants of concern, lead and cadmium, will be removed from solution. Reagent injection utilizes both natural processes, including biochemical reactions, dispersion, dilution and sorption in addition to active treatment to enhance the formation of metal phosphates which eliminates the bioavailability of lead and cadmium in the aquifer.

Short-Term Effectiveness

With the exception of Alternative 1 – No Action, which has no impact on short-term effectiveness, all of the Alternatives (2, 3 and 4) are expected to have minimal impacts on remediation workers and nearby residents during remedy implementation. Alternative 2 – MNA and Alternative 3 – Reagent Injection mainly involve the installation of monitoring wells/injection points while Alternative 4 – Pump and Treat involves the construction of a groundwater treatment plant which is anticipated to take longer to construct and include more construction and physical disturbance at the Site.

The potential risks to Site workers and area residents during remedy implementation will be addressed by adherence to protective worker practices, safety standards, and equipment. A site-specific health and safety plan will be prepared and trained personnel will perform remedial activities. Appropriate personnel monitoring and emission controls and monitoring will be provided, as needed, during remedy implementation.

Implementability

All of the alternatives are technically and administratively feasible, have been implemented at other similar sites, and make use of standard engineering practices. Alternative 1 – No Action requires the least effort to implement; however, without having the monitoring component to determine effectiveness of the remedy, it would not demonstrate when RAOs have been met.

Alternative 2 – MNA Plus Institutional Controls would be the most readily implementable alternative as it only involves installation of monitoring wells and subsequent

monitoring. Alternative 3 – Reagent Injection would require a pilot study to optimize its effectiveness as well as the installation of monitoring/injection wells. Alternative 4 – Pump and Treat Plus Institutional Controls would be the most difficult to implement as it would require the greatest degree of construction and acquisition of permits, such as the NJPDES permit for off-site discharge of the treated groundwater. The availability of service and materials required for the implementation of all alternatives is adequate. All alternatives, other than Alternative 1, require services and materials that are currently readily available from technology vendors, and are therefore, not expected to present a challenge to remedy implementation.

Cost

Alternative 1 – No Action has the lowest capital cost, but because of the lack of monitoring, achievement of remedial success could not be measured. Aside from Alternative 1 – No Action, Alternative 2 – MNA Plus Institutional Controls has the lowest capital cost of \$163,399 and would be the least costly alternative to implement with a total present net worth of approximately \$1.2 million which includes a 30-year groundwater monitoring program and well installation. Alternative 3 – Reagent Injection Plus Institutional Controls is estimated to have a capital cost of \$890,489 and an overall present net worth cost of approximately 1.6 million assuming a 10-year groundwater monitoring program. This is comparable to the cost of Alternative 2. Alternative 4 – Pump and Treat Plus Institutional Controls is the most expensive alternative with an estimated capital cost of \$1.6 million and a present net worth cost of approximately \$5.7 million which includes a 30-year groundwater monitoring program.

State/Support Agency Acceptance

The State of New Jersey concurs with the Preferred Alternative.

Community Acceptance

Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the Record of Decision for this site. The Record of Decision is the document that formalizes the selection of the remedy for a site.

SUMMARY OF THE PREFERRED ALTERNATIVE

The Preferred Alternative for cleanup of the groundwater at the NL Industries, Inc. Superfund Site is Alternative 3 – Reagent Injection Plus Institutional Controls.

Reagent Injection is an *in-situ* treatment whereby a reagent is injected into the groundwater aquifer via

injection wells or well points. The reagent applied will be selected based upon the results of the bench-scale treatability study (BSTS), as presented in the Focused Feasibility Study for Groundwater Remediation (FFS), and a field pilot study, which will be conducted as part of the Remedial Design. Preliminarily, the results of the BSTS reveal that phosphate reagents will be highly effective for treating lead and cadmium in groundwater. The use of phosphates for treating impacted soils and waters has been widely used to immobilize inorganic constituents, including lead. The field pilot study will confirm effectiveness at the Site and assist in calculating parameters required for successful remediation (i.e., number of well points, spacing, application method, etc.).

The reagent injection technique is based on the fact that metals dissolved or entrained in groundwater may react to form insoluble compounds and precipitates, or otherwise be immobilized by adsorption onto a substrate (i.e., the native soil) and/or by incorporating the metal into a molecular structure (intercalation) which may then adsorb or become incorporated into soil as a complex or precipitate. Reactions with phosphates tend to result in intercalation under proper conditions.

In order to promote the desired reactions, a more alkaline environment (pH of approximately 8.0 – 9.0) will be created prior to the reagent injection through addition of a basic compound into the groundwater aquifer to foster reactions between the native metals and the soil. The increased pH value is not required to be maintained following reagent injection and will return to ambient levels (i.e., pH of approximately 5.0 – 6.0) over time. The reagent will then be injected into the groundwater aquifer via a number of injection points. Generally speaking, precipitation reactions, such as those induced through certain injection reagents, including phosphates, follow a kinetic order of reaction. The order of reaction varies from compound to compound and with the geochemical conditions in which the reagent is applied (e.g., pH and reagent concentration); however, with the current Site conditions and concentrations of lead and cadmium in groundwater, it is anticipated that lead and cadmium will react with the phosphates first, followed by the non-target compounds (i.e., calcium and aluminum). This remedial alternative will also include continued monitoring of all COCs initially listed in the 1994 ROD, including site-related VOCs. The low concentrations of VOCs detected in recent groundwater monitoring data are expected to continue to decrease to acceptable levels via natural attenuation processes.

The effectiveness of the preferred alternative will be assessed by periodic groundwater sampling and analysis.

Quarterly sampling is proposed initially; however, the monitoring frequency will be modified based upon the data obtained during the pilot study and initial post-reagent injection monitoring events.

Institutional controls will also be implemented to prevent exposure to contaminated groundwater until the cleanup standards have been achieved for all COCs.

This alternative is estimated to take less than 10 years to achieve the cleanup standards. Therefore, as per EPA policy, 5-Year Reviews will be performed until remedial goals are achieved.

The preferred remedy was selected over other remedies because it is expected to achieve substantial and long-term risk reduction through treatment in the most efficient and timely manner.

Based on information currently available, EPA believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. EPA expects the Preferred Alternative will satisfy the statutory requirements of CERCLA Section 121(b); however, Alternative 4 – Pump and Treat Plus Institutional Controls will be retained as a contingency remedy.

Consistent with EPA Region 2's Clean and Green policy, EPA will evaluate the use of sustainable technologies and practices with respect to implementation of the selected remedy.

COMMUNITY PARTICIPATION

EPA and NJDEP provided information regarding the cleanup of the NL Industries, Inc. Superfund Site to the public through meetings, the Administrative Record file for the site, mailings and announcements published in *Today's Sunbeam*. EPA and NJDEP encourage the public to gain a more comprehensive understanding of the Site and the Superfund activities that have been conducted there.

For further information on EPA's Preferred Alternative for the NL Industries, Inc. Superfund Site, please contact one of the following:

Theresa Hwilka
Remedial Project Manager
(212) 637-4409

Natalie Loney
Community Relations
(212) 637-3639

U.S. EPA
290 Broadway 19th Floor
New York, New York 10007-1866

The dates of the public comment period; the date, the location and the time of the public meeting; and the locations of the Administration Record files are provided on the front page of this Proposed Plan.

NL Industries, Inc. Superfund Site information and reports can also be found online at the following address:

<http://www.epa.gov/region02/superfund/npl/nlindustries/pdf/PRAP.pdf>

GLOSSARY

ARARs: Applicable or Relevant and Appropriate Requirements. These are Federal or State environmental rules and regulations that may pertain to the Site or a particular alternative.

Carcinogenic Risk: Cancer risks are expressed as a number reflecting the increased chance that a person will develop cancer if exposed to chemicals or substances. For example, EPA's acceptable risk range for Superfund hazardous waste sites is 1×10^{-4} to 1×10^{-6} , meaning there is 1 additional chance in 10,000 (1×10^{-4}) to 1 additional chance in 1 million (1×10^{-6}) that a person will develop cancer if exposed to a Site contaminant that is not remediated.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act. A Federal law, commonly referred to as the "Superfund" Program, passed in 1980 that provides for response actions at sites found to be contaminated with hazardous substances, pollutants or contaminants that endanger public health and safety or the environment.

COPC: Chemicals of Potential Concern.

SLERA: Screening Level Ecological Risk Assessment. An evaluation of the potential risk posed to the environment if remedial activities are not performed at the Site.

FS: Feasibility Study. Analysis of the practicability of multiple remedial action options for the Site.

Groundwater: Subsurface water that occurs in soils and geologic formations that are fully saturated.

HHRA: Human Health Risk Assessment. An evaluation of the risk posed to human health should remedial activities not be implemented.

HI: Hazard Index. A number indicative of noncarcinogenic health effects that is the ratio of the existing level of exposure to an acceptable level of exposure. A value equal to or less than one indicates that the human population is not likely to experience adverse effects.

HQ: Hazard Quotient. HQs are used to evaluate noncarcinogenic health effects and ecological risks. A value equal to or less than one indicates that the human or ecological population are not likely to experience adverse effects.

ICs: Institutional Controls. Administrative methods to prevent human exposure to contaminants, such as by restricting the use of groundwater for drinking water purposes.

Nine Evaluation Criteria: See text box on Page 7.

Noncarcinogenic Risk: Noncancer Hazards (or risk) are expressed as a quotient that compares the existing level of exposure to the acceptable level of exposure. There is a level of exposure (the reference dose) below which it is unlikely for even a sensitive population to experience adverse health effects. USEPA's threshold level for noncarcinogenic risk at Superfund sites is 1, meaning that if the exposure exceeds the threshold; there may be a concern for potential noncancer effects.

NPL: National Priorities List. A list developed by USEPA of uncontrolled hazardous substance release sites in the United States that are considered priorities for long-term remedial evaluation and response.

Operable Unit (OU): a discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response

manages migration, or eliminates or mitigates a release, threat of a release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units, depending on the complexity of the problems associated with the site.

Present-Worth Cost: Total cost, in current dollars, of the remedial action. The present-worth cost includes capital costs required to implement the remedial action, as well as the cost of long-term operations, maintenance, and monitoring.

Proposed Plan: A document that presents the preferred remedial alternative and requests public input regarding the proposed cleanup alternative.

Public Comment Period: The time allowed for the members of a potentially affected community to express views and concerns regarding USEPA's preferred remedial alternative.

RAOs: Remedial Action Objectives. Objectives of remedial actions that are developed based on contaminated media, contaminants of concern, potential receptors and exposure scenarios, human health and ecological risk assessment, and attainment of regulatory cleanup levels.

Record of Decision (ROD): A legal document that describes the cleanup action or remedy selected for a site, the basis for choosing that remedy, and public comments on the selected remedy.

Remedial Action: A cleanup to address hazardous substances at a site.

RI: Remedial Investigation. A study of a facility that supports the selection of a remedy where hazardous substances have been disposed or released. The RI identifies the nature and extent of contamination at the facility and analyzes risk associated with COPCs.

TBCs: "To-be-considereds," consists of non-promulgated advisories and/or guidance that were developed by EPA, other federal agencies, or states that may be useful in developing CERCLA remedies.

USEPA: United States Environmental Protection Agency. The Federal agency responsible for administration and enforcement of CERCLA (and other environmental statutes and regulations), and final approval authority for the selected ROD.

VOC: Volatile Organic Compound. Type of chemical that readily vaporizes, often producing a distinguishable odor.

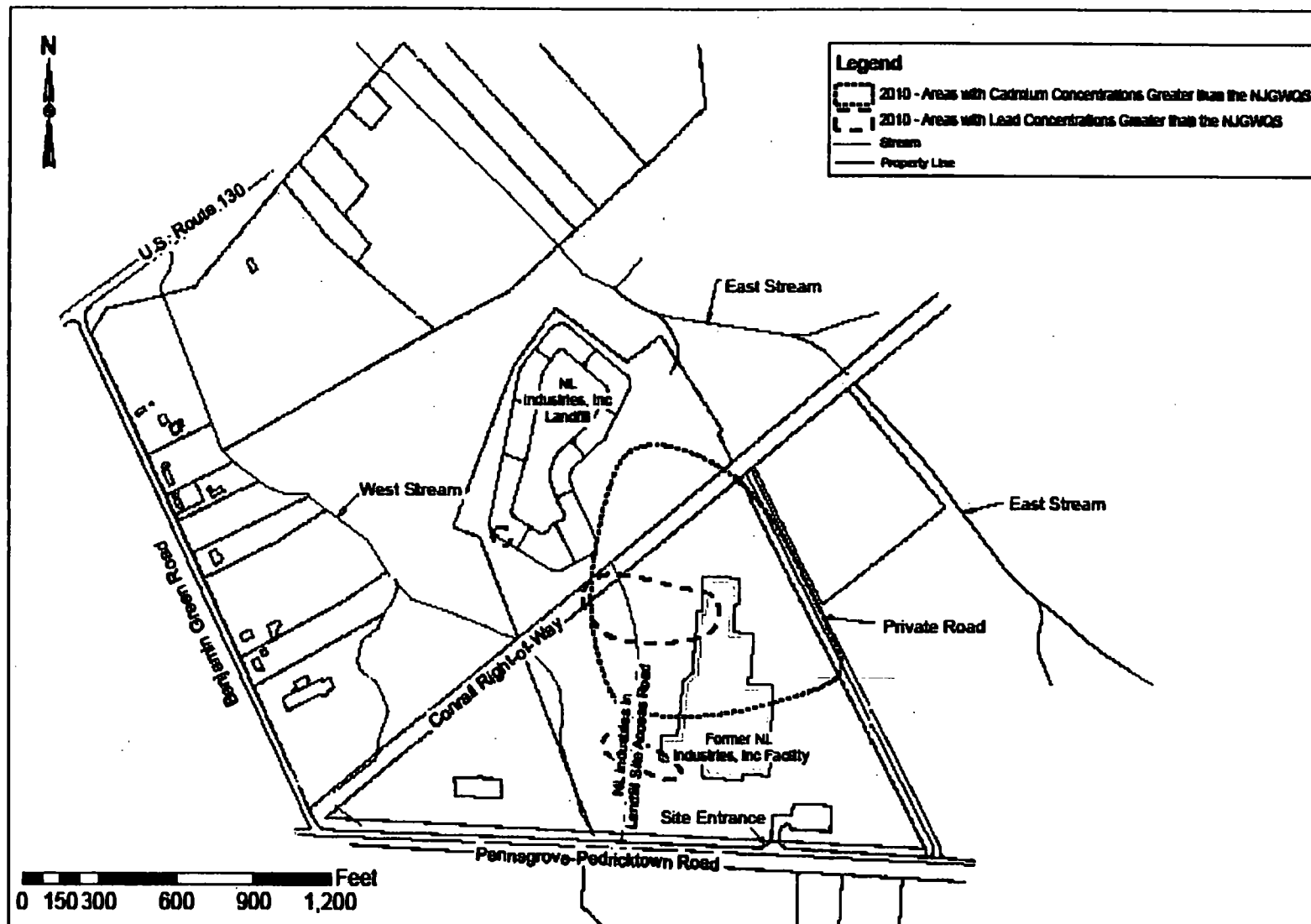


Figure 1 – NL Industries, Inc. Superfund Site Map

Attachment B

Public Notice published in Today's Sunbeam



**EPA IS HOSTING A PUBLIC MEETING FOR
THE NL INDUSTRIES SUPERFUND SITE**

The U.S. Environmental Protection Agency invites you to attend a public meeting to discuss EPA's proposed remedy to address a change to the groundwater remedy at the NL Industries Superfund Site in Pedricktown, New Jersey. EPA's preferred remedy, which is described in the Proposed Plan, is

Alternative 3: Reagent Injection Plus Institutional Controls.

The public meeting will be held at the:

**Oldmans Township School
School Cafeteria
10 Freed Road
Pedricktown, NJ 08067
on Thursday, July 7, 2011
at 6:30 PM**

Before selecting the final remedy, EPA will consider oral comments presented at the public meeting and written comments received during the thirty (30) day comment period. The comment period for the proposed plan runs from June 22, 2011 to July 21, 2011. Copies of the Proposed Plan and the Administrative Record for the site are available at the following locations:

**Penns Grove Public Library
222 South Broad Street
Penns Grove, New Jersey 08069**

**US EPA Records Center
290 Broadway, 18th Floor
New York, New York 10007-1866
212-617-4308
By Appointment Only**

Or you can access a copy of the Proposed Plan at:

<http://www.epa.gov/region02/superfund/npl/nlindustries/pd/PRAP.pdf>

Written comments should be sent to: Theresa Hwilka, Remedial Project Manager, U.S. EPA,
290 Broadway, 18th Floor, New York, NY 10007-1866, tv 212-637-4409, fax 212-637-4429

Or you can e-mail your comments to:

bwilka.theresa@epa.gov

If you have any questions regarding the information session you can, e-mail Ms. Natalie Loney,
Community Involvement Coordinator at:

loney.natalie@epa.gov

or call Ms. Loney: (212) 637-3639 or toll-free at 1-800-346-5009.

Attachment C

July 7, 2011 Public Meeting Attendance Sheet

NAME	ADDRESS (with Zip Code)	E-mail	Organization
JANICE FRISBY-DOWE	126 PERKINTOWN RD PERKINTOWN 01067	JFrisbydowe@ymhoo.com	President
Jayne Reed	42 Per Kinton Rd Bedrid	Reed Family Si@comcast.net	Reeder
Therese Kucowicz	191 Rt 180	TKucowicz@Johns.edu	Resident
Patricia GRIFFIN	72 Dasher Ave Tabor, DB 19701	paung4@aol.com	Property Owner
	for Property @ 19 New Rd.		
Edna Klinech	221 P.G./ALBURN Rd		"
Eme Swosar	155 PERKINTOWN RD.	ELECTRICALS COMPANY, INC. Rt.	
* SEND COPY OF PROPOSED PLAN:			



NL INDUSTRIES SUPERFUND SITE

PUBLIC MEETING

JULY 7, 2011 @ 6:30 PM

Oldmans Township School

10 Freed Road

Pedricktown, NJ 08067

PLEASE PRINT CLEARLY

NAME	ADDRESS (with Zip Code)	E-mail	Organization
Clinton Jones	63 PerKintown Rd Pedricktown N.J. 08067		
Lester KYLE	129 PerKintown RD.		
Melinda Taylor	41 E Mill St		Municipal
William Miller	16 Benjamin Green Rd 08067		Township
Don Nijje	220 PerKintown Rd		
Glady's Fries	12 PENNSV - Pedt Rd.		
Susan Koye	187 N. Railroad Ave Pedricktown	Susan.Koye1@gmail.com	
Jim NIFE	12 PENNSGROVE PEO. RD		
Johanne Ditzler	74 PerKintown Rd		
Jacob Leed	124 Deborah Drive Wyomissing, PA 19610		
JEFF LEED	2209 Quarry Drive, Ste. C-35, Reading PA 19609		
Jaime Dolbow	103 PennsGrove Auburn Rd.		
EW DORN	25 PENS - PED RD		
Tom Becuta	32 PennsGrove - Ped Rd.		
Barbara Baber	191 M - Ped Rd Pedricktown		Resident
George Bradford	27 Main St. Auburn		Township
EARL PAULSON	122 Auburn - Ped Rd. PA.		Resident
John Dawe	85 New Road		

Attachment D

Transcript of the July 7, 2011 Public Meeting

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 2

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NL INDUSTRIES SUPERFUND SITE

PUBLIC MEETING

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Oldmans Township School
10 Freed Road
Pedricktown, New Jersey

July 7, 2011
6:30 p.m.

P R E S E N T:

NATALIE LONEY,
Community Involvement Coordinator

THERESA HWILKA,
Remedial Project Manager

KIM O'CONNELL,
Section Chief,
Southern New Jersey Remediation Section

MIKE SKORKA,
Hydrogeologist

1 MS. LONEY: We're going to
2 get started now. I want to thank
3 you all for coming out. My name
4 is Natalie Loney. I'm the
5 Community Involvement Coordinator
6 with the Environmental Protection
7 Agency. And with us this evening
8 are three other EPA personnel.

9 That's Theresa Hwilka.
10 She's the Remedial Project Manager
11 on this site.

12 Next to her is Kim
13 O'Connell. Kim O'Connell is her
14 boss. She's the Chief of the
15 South Jersey Superfund branch.

16 And next to her is Mike
17 Skorka. Mike is a hydrogeologist
18 assigned to the site.

19 The purpose of tonight's
20 meeting is to go over the EPA's
21 proposed plan to address
22 contamination at the NL Industries
23 Superfund site. This particular
24 proposed plan is going to be
25 looking at the groundwater

1 component of contamination at the
2 site.

3 And since this is a public
4 meeting, EPA will be taking
5 comments tonight for the record.
6 And we have a stenographer here,
7 who will be recording all of the
8 comments, our presentation, and
9 your questions.

10 So, the only thing that I
11 ask is that at the end of the
12 presentation, when you're ready to
13 ask questions, just state your
14 name for the record.

15 So, this is the agenda for
16 this evening. We're going to do a
17 brief overview of the Superfund
18 process, we'll look at the site,
19 talk about the history of the
20 site, talk about the amendments to
21 the Record of Decision, and the
22 alternatives, which is the
23 document that you have here, the
24 proposed remedial alternative.
25 And then we'll open up the floor

1 for questions and answers.

2 This particular slide kind
3 of will give you a roadmap as to
4 how we came to this point in the
5 history of the Superfund site.
6 This is generally the process that
7 takes place at any Superfund site.

8 We start off with the site
9 discovery. In some Superfund
10 sites where there's groundwater
11 contamination, sometimes residents
12 may notify the state or even the
13 federal government. There's a
14 whole host of ways that Superfund
15 sites are brought to the attention
16 of the federal government.

17 Once the site is discovered,
18 so to speak, we go through a
19 process of investigating the site
20 and looking at our initial site
21 assessment. And it goes through a
22 process here called the NPL
23 ranking or listing.

24 Before a Superfund site
25 becomes a Superfund site, it

1 actually goes through a process
2 where there are a series of
3 questions and analyses to
4 determine whether or not the
5 contamination at that site is
6 egregious enough to warrant being
7 placed on the Superfund list.

8 This site went through that
9 process, and it was determined
10 that it did qualify to be placed
11 on the Superfund list, and then it
12 became a Superfund site.

13 Once a site becomes a
14 Superfund site, that opens it up
15 so that Superfund or federal
16 dollars can be used if a
17 responsible party is not present
18 at a site.

19 We've completed the NPL
20 ranking and we went through a
21 process called the Remedial
22 Investigation and Feasibility
23 Study. What that is is looking at
24 the nature and extent of
25 contamination at a Superfund site

1 and what feasible options are
2 available to address the
3 contamination.

4 So, we've gone through the
5 identification of the site, it was
6 placed on the NPL or the Superfund
7 list, and we looked at the nature
8 and extent of contamination.

9 Once that is completed, it
10 goes to the next step, where,
11 after looking at the nature, the
12 extent of the contamination, and
13 feasible options for addressing
14 it, EPA comes up with what we
15 believe is the best alternative to
16 remediate or clean up that site.

17 And that's why we're here
18 tonight. We're presenting to you
19 what we believe is the best remedy
20 to address the contamination at
21 the site.

22 As part of the Superfund
23 process, we are required by law to
24 have public comment, where there's
25 a 30-day comment period after

1 we've gone through a public
2 meeting and expressed what we
3 believe is the best remedy and
4 take questions from the community.

5 You can either submit your
6 comments tonight in the form of a
7 question or a statement on the
8 record or you may decide that you
9 want to submit a comment later on.
10 You can submit it via e-mail, via
11 snail mail, and the address and
12 e-mail address for Theresa is
13 available at the end of the back
14 of this proposed plan.

15 Now, the comment period for
16 this particular remedy is July 21.
17 So, if you want to comment
18 tonight, you can do so, but you
19 have until July 21 to submit
20 comments to the Agency.

21 Once the comments are
22 received and the comment period
23 closes, EPA goes through a process
24 where we review the comments, we
25 respond to all of the comments

1 that we receive, and that's put
2 together in a document called a
3 responsiveness summary. The
4 document will be available to the
5 public.

6 And that responsiveness
7 summary is part of a larger
8 document called a ROD, the Record
9 of Decision. That Record of
10 Decision basically is -- this is
11 what EPA's final decision is as to
12 what remedy will be implemented at
13 the site.

14 So, we've gone through the
15 process of listing, we've gone
16 through the process of site
17 analysis, and we're now in the
18 portion where we're presenting our
19 remedy and you're commenting on
20 it.

21 Subsequent to that will be
22 the Record of Decision. Once the
23 Record of Decision is final,
24 that's when we actually go into
25 the actual design and

1 implementation of the remedy.

2 I'm going to turn the floor
3 over to Theresa. She'll take you
4 through the site history, the
5 proposed plan, et cetera, et
6 cetera.

7 Remember, at the end of
8 everything -- hopefully, you have
9 pens or you have the proposed
10 plan -- if there are any questions
11 that stick out in your mind during
12 the presentation, take a moment to
13 jot them down so that at the end
14 of the presentation you'll be able
15 to ask your questions.

16 Thank you.

17 MS. HWILKA: Again, my name
18 is Theresa Hwilka, and I'm the
19 Remedial Project Manager for the
20 site. If at any time you can't
21 hear, please raise your hand and
22 let me know.

23 I'm the project manager
24 currently for the site. This
25 figure right here is an overview

1 of the NL Industries Superfund
2 site. It's bordered by
3 Pennsgrove-Pedricktown Road,
4 Benjamin Green Road, U.S. Route
5 130.

6 (Pause in proceedings)

7 MS. HWILKA: So, it's about
8 a 44-acre site and it's bisected
9 by the active railway. Some site
10 features include the closed
11 landfill that's about 5.6 acres.
12 As I just said, this landfill is
13 closed.

14 It's currently being
15 maintained by NL Industries, but
16 it's not part of our Superfund
17 site. This landfill was closed
18 prior to the listing of the site.
19 And it does have a leachate
20 collection system and it is
21 monitored by the State of New
22 Jersey.

23 This is where the former NL
24 facility was actually located.
25 This is where the building and

1 operations were located.

2 We also have the west
3 stream, which actually continues
4 beyond Route 130 and eventually
5 discharges into the Delaware
6 River. There's also the east
7 stream on the other side.

8 As most of you know -- you
9 might be residents of Benjamin
10 Green Road -- there are private
11 residential and a few commercial
12 properties along Benjamin Green
13 Road. And these residences are on
14 public water supply, whereas those
15 residences located along Route 130
16 utilize groundwater for drinking
17 water.

18 The properties in the
19 vicinity of this site are used for
20 residential, commercial,
21 agricultural, and military
22 purposes.

23 In terms of site history,
24 between 1972 and 1984, the site
25 was used as a lead-acid battery

1 recycling and secondary lead
2 reclamation facility. Basically,
3 what this means is there was a
4 battery-crushing operation.

5 So, they crushed the
6 batteries, the sulfuric acids that
7 were in the batteries were
8 drained, and then the remaining
9 material was processed to recover
10 the lead.

11 In these battery-crushing
12 operations, the waste resulting
13 from these operations were
14 disposed of in a landfill on site,
15 and the soil and sediment from
16 surrounding the site was
17 contaminated with metal, primarily
18 lead. And the groundwater
19 contamination consisted primarily
20 of lead and cadmium with a few
21 localized areas of volatile
22 organic compounds.

23 So, in 1983, the site was
24 placed on the National Priorities
25 List. That's one of the steps

1 that Natalie just referred to.
2 And in 1986, NL Industries assumed
3 responsibility for conducting the
4 Remedial Investigation and the
5 Feasibility Study, and the EPA did
6 the oversight for that.

7 So, after we did the RI/FS,
8 in 1989, EPA initiated the
9 multibased cleanup activities.
10 And this was done to address the
11 most immediate public health
12 concerns at the time.

13 These activities included
14 things likes constructing security
15 fences, encapsulating slag piles,
16 demolition of the buildings, and
17 removal of the most highly
18 contaminated stream sediments.

19 After we did those initial
20 actions, the remaining remedial
21 efforts were split up into what we
22 call operable units. So, we have
23 Operable Unit 1 and Operable Unit
24 2.

25 Operable Unit 2 was actually

1 done first, and the EPA issued
2 that Record of Decision for this
3 operable unit in 1991. This
4 covered addressing slag and the
5 lead piles, contaminated surfaces
6 and debris, and contaminated
7 standing water and sediments.

8 Other activities under this
9 operable unit included things like
10 offsite reclamation of lead-
11 containing materials,
12 solidification and stabilization
13 of the slag piles and offsite
14 disposal of that, decontamination
15 of the building floors and
16 surfaces, and offsite disposal and
17 treatment of the contaminated
18 standing water and sediments.

19 Those are some examples of
20 what was conducted under Operable
21 Unit 2, and these activities were
22 initiated in 1992 and completed in
23 1995.

24 This brings us to Operable
25 Unit 1. And the ROD for this

1 operable unit was issued in 1994,
2 and it addressed soil,
3 groundwater, and the stream
4 sediment. So, there was a lot of
5 media being covered in this
6 operable unit.

7 Our objective for this unit
8 was to leave no greater than five
9 hundred parts per million of lead
10 remaining in any site soils and
11 stream sediment. And we also
12 needed to restore the contaminated
13 unconfined aquifer to drinking
14 water standards.

15 In terms of remedy selected
16 in this ROD, for the soil and
17 sediment we selected excavation,
18 and for the contaminated
19 groundwater a pump and treatment
20 system was originally selected as
21 the remedy.

22 In 1999, we issued what's
23 called an Explanation of
24 Significant Differences. This
25 document had a small change in the

1 remedy for soil and sediment,
2 whereby instead of excavating the
3 material and disposing of it on
4 site, we excavated the material
5 and did offsite disposal.

6 I'll give you a little
7 history of the soil and sediment
8 portion of this operable unit.
9 What we're here to discuss today
10 is really the groundwater
11 component, so I'll go over this
12 rather quickly.

13 For OUL, the soil and
14 sediments, we had remedial actions
15 that were initiated in 2000 and
16 completed in 2003. What we did
17 here was we excavated the soil
18 having greater than five hundred
19 parts per million of lead because
20 that was our remedial action
21 objective.

22 These were the soils that
23 were located in that former
24 facility area because that's where
25 all the buildings were and all the

1 slag piles were and everything.

2 But we also removed some
3 contaminated sediment having
4 greater than five hundred parts
5 per million along portions of the
6 east stream, the west stream, and
7 the channel north of Route 130 --
8 that's the Army Corps section --
9 and we disposed of the soil and
10 sediment in an offsite disposal
11 facility.

12 After we completed this
13 remedial action, we continued to
14 monitor the site to ensure that we
15 didn't miss any soils that may
16 have had lead over five hundred
17 parts per million.

18 And we have recently looked
19 at all the monitoring and looked
20 at all the data, and we did find
21 some additional areas in the west
22 stream that had lead that are
23 going to be addressed this summer,
24 2011, via excavation again.

25 So, I'm going to move into

1 the groundwater portion of this
2 presentation. I just want to give
3 you an overview of what we're
4 talking about when we say
5 "groundwater".

6 Normally, you have your land
7 surface with your vegetation. You
8 have rain and runoff that permeate
9 this top layer of soil called the
10 unsaturated zone.

11 The reason why it's called
12 that is if you were to look in the
13 soil and look between the pores --
14 it's hard to see in this light --
15 you have water-filled spaces and
16 you also have spaces of air.

17 When you go beneath the
18 water table, this is the saturated
19 zone. What makes it saturated is
20 there are no more air pockets.
21 All but four feet from the soil
22 are filled with water, and this
23 water is what we refer to as
24 groundwater.

25 On our site, the water table

1 is as shallow as five feet below
2 the land surface in some areas.
3 So, our saturated soil zone, the
4 first layer, is what we call the
5 unconfined aquifer. This
6 unconfined aquifer is the top
7 layer that's about twenty feet
8 thick. This is where we're
9 finding contamination at the site.

10 So, there's deeper
11 groundwater in the other aquifer
12 layers, but, again, our
13 contamination is what we're
14 finding in the unconfined aquifer
15 portion.

16 With respect to groundwater,
17 monitoring was conducted during
18 the Remedial Investigation in 1988
19 and 1989. As I said, the site-
20 related contaminants were found in
21 the unconfined aquifer. The
22 primary contaminants of concern
23 were lead and cadmium. There were
24 a few localized areas of volatile
25 organic compounds as well.

1 As part of the remedial
2 design process in the Superfund,
3 we were looking at the pump and
4 treat remedy because that was what
5 was originally selected in 1994 in
6 the ROD. And, so, when we got to
7 the remedial design phase, we did
8 two phases of groundwater
9 evaluation.

10 So, the first groundwater
11 evaluation was conducted in 1997.
12 And, basically, what we determined
13 was that with low groundwater pH,
14 there are higher concentrations of
15 the contaminants, the lead and
16 cadmium.

17 Again, the low pH is a
18 result of the battery-crushing
19 operations and all the acids that
20 were deposited on site. So, it
21 lowered the pH below a natural
22 range, which for this area would
23 be a pH of five or six.

24 However, we also noted in
25 the stage one investigation that

1 the concentrations of the
2 contaminants had decreased since
3 the original sampling that was
4 done in the RI.

5 So, we moved on to phase
6 two, and that was conducted in
7 1998. And some of the main things
8 that we grasped from this
9 investigation was from the pump
10 tests. So, again, we were
11 evaluating the pump and treat
12 remedy and working towards the
13 design.

14 So, the pump test indicated
15 that a constant pump rate --
16 constant pumping of contaminated
17 groundwater was not highly
18 efficient at removing the metals
19 from the groundwater. And, again,
20 we also saw a trend of continued
21 decrease in the mass contaminants
22 over time.

23 We removed the source
24 material with all the excavation,
25 and there are also natural

1 processes at work helping to
2 degrade the contaminants as well.

3 So, we did additional
4 groundwater monitoring in 2004,
5 2007, and 2010, and, again, were
6 continuing to see this decreasing
7 trend of contaminants of concern.

8 The majority of this
9 contamination is actually located
10 beneath that corner facility area.
11 So, that, again, is that area kind
12 of near the landfill where the
13 former facility was located in
14 that southeast corner.

15 We've also noted that there
16 hasn't been significant migration
17 observed in these recent
18 samplings.

19 So, this figure -- it's hard
20 to see, I'm trying to use my
21 pointer for you -- this is the
22 historical extent of lead
23 concentrations above the
24 groundwater quality standards.
25 The current standards for lead are

1 five parts per million.

2 So, you see Pennsgrove-
3 Pedricktown Road, Benjamin Green
4 Road, and here's Route 130. And
5 here's where the former facility
6 was and this is, of course, the
7 landfill.

8 So, back in 1983, our lead
9 contamination was around within
10 this purple line here. And then
11 as you move on to 1988, it was
12 this green line. So, you can see
13 it's getting smaller and smaller;
14 1998, this yellow, and then 2007,
15 2010, this area of red and blue
16 here and here.

17 And the mass of lead, when
18 we calculate the mass of lead over
19 time, it's decreased from about
20 220 pounds in 1983 to about 2.7
21 pounds in the groundwater in 2010.

22 This is a similar figure for
23 cadmium, which is the other
24 primary contaminant of concern in
25 the groundwater. Again, the green

1 is from 1988, which extends all
2 the way down almost towards
3 Pennsgrove-Pedricktown Road. And
4 in 2007 to 2010, it's the red line
5 here.

6 The mass of cadmium has
7 decreased from about seventy
8 pounds in 1988 to about five point
9 nine in 2010.

10 In addition to sampling the
11 groundwater at the site, as I
12 said, the residents along Route
13 130 require the groundwater as a
14 drinking water source. So, we
15 have wells north of the landfill
16 here where we monitor to make sure
17 that the contaminants aren't
18 migrating towards those residents.
19 And then we also sampled the
20 actual residential properties and
21 sampled their groundwater.

22 The most recent sampling was
23 in 2004, 2006, 2007, and 2010.
24 What we found is that for the most
25 part, most of the lead and cadmium

1 concentration in those residential
2 properties were either not
3 detected at all, they were
4 significantly below the
5 groundwater treatment standards.
6 For lead, again, five parts per
7 billion; for cadmium, it's four
8 parts per billion.

9 There was one instance where
10 there was a minor detection over;
11 however, we don't believe that one
12 is site-related.

13 Back in the 1990s, we had
14 done the initial human health risk
15 assessment as part of that
16 Superfund process. This risk
17 assessment was based on the
18 groundwater samples that were
19 taken in 1989.

20 And what the risk assessment
21 told us back then was there was
22 unacceptable risk for potential
23 future receptors, and this is due
24 to exposure of groundwater if it
25 was ingested.

1 So, when we started doing
2 this investigation of the
3 groundwater remedy, we also took
4 another look, a recent look, at
5 the risk assessment to see if
6 that's still valid today.

7 And what we found was that
8 it is because the potential
9 exposure pathways for future land
10 use, to use this water for
11 drinking water, you'd be exposed
12 to ingestion. So, that still
13 poses a risk and remains
14 applicable for the site today.

15 So, while we are seeing
16 decreases, significant decreases
17 in the contaminants over time,
18 they're still at levels that are
19 above those drinking water
20 standards right now. So,
21 therefore, we still need to take
22 action to address that to ensure
23 that there's no risk to the public
24 or the environment.

25 So, again, 1994 ROD, that

1 initially selected pump and treat
2 for the groundwater remedy. But,
3 again, as we look over time, since
4 the remedial investigation to the
5 2010 sampling, we've seen that
6 significant decrease in the
7 contaminants of concern. Again,
8 the main contaminants here are
9 primarily lead and cadmium.

10 Also, now that it's 2010,
11 there are newer technologies that
12 may be more efficient in
13 addressing the current
14 contamination in groundwater than
15 the initial pump and treatment
16 remedy that was selected in 1994.

17 As a result, we decided to
18 look at other alternatives. Is
19 there anything else we could do,
20 aside from pump and treat, to
21 address the contaminants of
22 concern today in a more efficient
23 and more expedited manner?

24 Our remedial action
25 objectives for this project

1 include to restore the
2 contaminated unconfined aquifer so
3 that it meets drinking water
4 standards for all contaminants --
5 not just for lead and cadmium, but
6 for any contaminants site-
7 related -- to minimize any
8 potential for migration; and,
9 also, to prevent exposure for
10 human health purposes and
11 environment.

12 Again, I told you exposure
13 would be ingestion for potential
14 future use, like a residential
15 use.

16 So, now we'll look at the
17 Feasibility Study. We looked at
18 four alternatives.

19 The first one is no action.
20 That's required to be maintained
21 in a Feasibility Study because it
22 serves as a basis of comparison
23 because no action means just what
24 it says; no actions are taken to
25 address groundwater. There are no

1 institutional controls, which
2 would restrict the use of
3 contaminated groundwater until we
4 reach our cleanup objectives, and
5 this alternative provides no
6 monitoring for contaminant
7 concentrations.

8 Alternative two is called
9 monitored natural attenuation, and
10 that's coupled with institutional
11 controls. Monitored natural
12 attenuation relies on natural
13 processes to clean up or attenuate
14 pollution in groundwater.

15 These are three examples of
16 what these processes are. You can
17 have biochemical reactions, and
18 that's basically within the soil
19 and groundwater.

20 You have microbes that can
21 use the chemical as a food source.
22 And by using it as a food source,
23 it alters the chemical and reduces
24 it to harmless water and gas or
25 less toxic water.

1 Also, in nature you can have
2 adsorption, where the groundwater
3 is mixed in with the soil, the
4 saturated soil. So, you can have
5 an instance where the chemical
6 adsorbs directly to the soil.
7 It's basically sticking to the
8 soil, so it's still in the aquifer
9 but it's removed from the
10 groundwater. The groundwater is
11 flowing through, the chemical is
12 adsorbed, and the actual
13 groundwater coming out has lower
14 concentration.

15 The last one is dilution.
16 So, over time, as clean
17 groundwater from other areas are
18 flowing through the site, you're
19 essentially diluting the chemicals
20 there and reducing the
21 concentration.

22 Alternative three is reagent
23 injection -- let me step back.

24 Monitored natural
25 attenuation, these are the

1 processes, but this alternative
2 will also include monitoring over
3 time to make sure that that's
4 working and we're seeing decreases
5 in contaminant concentrations.
6 And it also includes institutional
7 controls, again, to restrict the
8 use of the groundwater until that
9 contaminated groundwater is clean.

10 So, alternative three is
11 reagent injection. This involves
12 injection of reagent into the
13 unconfined aquifer into the
14 injection wells. And what this
15 does is it facilitates adsorption
16 gases.

17 So, with this method, we
18 have direct adsorption, where the
19 chemicals just adsorb directly to
20 the soil. But what this
21 alternative does is it's a more
22 complex reaction.

23 So, if you picture these
24 green circles as being, for
25 example, cadmium, it's bound.

1 within a crystal lattice of
2 another structure. It fosters
3 this development of this molecule,
4 and then that whole structure
5 adsorbs into the aquifer soil.

6 So, it's a little more
7 complex reaction that's more
8 tightly binding your contaminants
9 within another structure first.
10 And then when it adsorbs to the
11 aquifer soil, you're again
12 removing the contaminants from the
13 groundwater and, thereby, since
14 it's also a more complex reaction
15 and more tightly bound, it's less
15 susceptible to other changes, you
17 know, chemical changes in the
18 groundwater that can occur over
19 time.

20 And, again, this alternative
21 would also include monitoring over
22 time so we can see our progress
23 and achieve our cleanup goals, as
24 well as the institutional
25 controls.

1 The fourth one is pump and
2 treat, which was, of course,
3 retained in the feasibility study
4 since it was the originally
5 selected remedy. The pump and
6 treat would involve the
7 construction of a groundwater
8 treatment plant that would be put
9 on the site and it would pump the
10 groundwater up.

11 Initially, in the initial
12 ROD, it was estimated at a 250
13 gallons per minute pump rate. So,
14 the water would be pumped up and
15 then go through reactions such as
16 precipitation/fiocculation and a
17 polishing step to remove the
18 contaminants, and then that
19 treated water would be discharged
20 to the Delaware River, which is
21 about one point five miles away.

22 And, again, this target of
23 the clean water meets the drinking
24 water standard. And, again, pump
25 and treat also includes monitoring

1 and implementation of
2 institutional controls.

3 Now let's look at the cost
4 of the remedy and how long it's
5 going to take to reach our cleanup
6 objective.

7 Obviously, alternative one
8 wouldn't cost any money because we
9 wouldn't be doing anything. And
10 there's no way to really tell or
11 monitor when we'd reach a cleanup
12 goal with no action.

13 For M&A, it would be about
14 \$1.2 million and it would take
15 roughly greater than fifty years
16 to let those natural processes
17 work and meet our cleanup
18 objectives.

19 For reagent injection, it's
20 comparable to M&A, about \$1.6
21 million. However, the key here is
22 the time frame. It will take less
23 than ten years to achieve our
24 cleanup standards.

25 With pump and treat, this is

1 actually the most expensive,
2 roughly \$5.7 million, and it
3 would, again, take more than fifty
4 years to reach our cleanup
5 objectives.

6 So, when we evaluate all
7 these alternatives, we look at
8 nine criteria. We look at
9 protection of human health and the
10 environment, compliance with state
11 and federal regulations, the
12 balancing criteria, long-term
13 effectiveness and permanence -- is
14 this going to work and last --
15 reduction of toxicity, mobility
16 and volume, short-term
17 effectiveness, implementability,
18 and cost.

19 And then we also look at
20 modifying criteria, which are
21 support agency concerns as well as
22 community concerns, which is
23 partly why we're here today to get
24 your comments and feedback.

25 So, after you evaluate the

1 alternatives against those nine
2 criteria, we feel that alternative
3 three, the reagent injection, is
4 the preferred alternative at this
5 time.

6 This includes pH adjustment,
7 and the reagent injection fosters
8 that adsorption reaction, the
9 monitoring, and the implementation
10 of the institutional controls.

11 Again, this alternative, we
12 feel, provides the best balance of
13 those nine criteria. It's able to
14 reduce the toxicity, mobility, and
15 volume of contaminants in the
16 shortest time frame and has the
17 greatest degree of long-term
18 effectiveness and permanence, and
19 it's also cost effective.

20 With that, I can open it to
21 questions and comments.

22 And, again, here is all of
23 our contact information. If you
24 want to submit your comments, you
25 can do so via e-mail. Or I guess

1 you could send your comments to me
2 as well at 290 Broadway by July
3 21.

4 And this is the website that
5 has additional site documents, all
6 the history of the site, the ROD,
7 and other documents to learn more
8 about NL Industries Superfund
9 site.

10 MR. KYLE: Can we ask
11 questions now?

12 MS. HWILKA: Yes.

13 MR. KYLE: My name is Lester
14 Kyle. I am a previous haz mat
15 worker. I've worked on Superfund
16 jobs before.

17 Is this still a Superfund
18 job?

19 MS. HWILKA: Yes.

20 MR. KYLE: What is cost
21 effective is getting rid of the
22 dump.

23 MS. HWILKA: The landfill
24 here you're referring to on the
25 site?

1 MR. KYLE: Yes.

2 MS. HWILKA: That's not part
3 of our site.

4 MR. KYLE: That's your main
5 problem.

6 MS. HWILKA: Well, the site
7 has a leachate collection, so any
8 contaminants that were enclosed --
9 the landfill is capped, and then
10 anything that runs through,
11 contaminants are collected in the
12 leachate system and disposed of
13 offsite.

14 That's maintained by NL
15 Industries. And, also, they have
16 to report to the New Jersey
17 Department of Environmental
18 Protection.

19 MR. KYLE: Can I tell you
20 what I know about that dump?

21 The job that I worked is
22 eight miles up the road, the Rose
23 project in Bridgeport. The outfit
24 that started the cleanup job on
25 National Lead hired the firm that

1 was working on our job at the
2 time. They come down there and
3 they did a study of the fourteen
4 monitoring wells around that dump.

5 MS. HWILKA: Around this
6 dump?

7 MR. KYLE: Yes.

8 I've never been on that site
9 in my life, and I know about it
10 from the guys that did it.

11 Five of them were boiling at
12 the time.

13 Now, who knows about that
14 besides them and me?

15 MS. HWILKA: Well, now,
16 currently, we have wells all
17 around. There's wells all around
18 this area --

19 MR. KYLE: At that time,
20 there was fourteen.

21 I even come to a meeting, a
22 public meeting we had right here,
23 and brought it up at the time. I
24 wasted my time because the guy
25 that was here in the audience from

1 National Lead didn't know nothing
2 about the study or the sampling
3 that was taken by the two guys
4 that was on our job that did it.

5 MS. HWILKA: What I can tell
6 you about the current state is we
7 have 28 monitoring wells,
8 currently.

9 MR. KYLE: Why is that?
10 Because you made that dump
11 bigger.

12 MS. HWILKA: Well, we put
13 the wells in to determine the
14 nature and extent of the
15 groundwater --

16 MR. KYLE: Tell the truth
17 now.

18 Originally, that dump was
19 five acres. And you made it
20 bigger. You added to it.

21 MS. HWILKA: When it was
22 listed as --

23 MR. KYLE: Am I right or
24 wrong?

25 MS. O'CONNELL: You're not

1 correct.

2 MR. KYLE: I'm not?

3 MS. O'CONNELL: The landfill
4 was created by NL when they were
5 operating.

6 MR. KYLE: But when they had
7 the public hearing here, it was
8 brought up at the meeting that
9 they was going to add to that
10 landfill. That was one reason I
11 come to it.

12 MS. HWILKA: Sir, do you
13 know the year that you're talking
14 about?

15 Because we had that
16 explanation --

17 MR. KYLE: Well, whichever
18 public hearing you had right here.
19 National Lead representative was
20 here.

21 MS. O'CONNELL: We had one
22 in 1994, before we issued --

23 MR. KYLE: That was probably
24 it.

25 MS. O'CONNELL: That may

1 have been it.

2 This work is being done by a
3 group of responsible parties,
4 including NL, under EPA's
5 authority, being paid for and
6 performed by responsible parties
7 that include NL and other
8 entities.

9 That landfill was closed
10 prior to it becoming a Superfund
11 site. It was closed under State
12 authority and is currently, by
13 NL --

14 MR. KYLE: I already know
15 all that.

16 MS. O'CONNELL: And they
17 manage it and they report to the
18 State and the State is in charge
19 of that closed landfill. And they
20 do monitor the leachate, we know
21 that.

22 But our Superfund site, what
23 we're looking at, when this site
24 came on the NPL, the immediate
25 problem was extensive abandoned

1 hazardous waste. There were slag
2 piles all over the place, severely
3 contaminated soils, severely
4 contaminated sediment in the
5 stream, waste everywhere, and
6 buildings that were crumbling, a
7 physical hazard --

8 MR. KYLE: We all know that.
9 We live here.

10 MS. O'CONNELL: What we did
11 when we studied the site, we had
12 studied all the contamination, we
13 took an immediate action to take
14 care of the exposed waste which
15 was an immediate risk. Then,
16 after the buildings were gone and
17 the slag piles were gone, we
18 sampled all the soils, the
19 sediment.

20 And we have 28 wells in our
21 network. That does not include
22 any leachate monitoring that is
23 done by NL.

24 MR. KYLE: You mean 28 wells
25 on this site?

1 MS. O'CONNELL: All on this
2 site.

3 MR. KYLE: What about around
4 the dump?

5 There was fourteen.

6 Is there still fourteen?

7 MS. O'CONNELL: There's not
8 fourteen.

9 We have 28 wells that we've
10 been monitoring over time and
11 we're looking at trends --

12 MR. KYLE: These two
13 gentlemen came down here and took
14 samples from fourteen wells around
15 that dump.

16 And that particular night,
17 we went up to the wall where there
18 was a big map hanging and we
19 counted them.

20 MS. O'CONNELL: You're
21 saying in 1994, there was data
22 presented to you --

23 MR. KYLE: If that's the
24 year.

25 MS. O'CONNELL: There was

1 groundwater contamination, there
2 still is, in the vicinity of the
3 landfill.

4 MR. KYLE: It's from the
5 dump.

6 MS. O'CONNELL: Show them
7 the groundwater flow direction.

8 The groundwater flows
9 towards the Delaware River.

10 MR. KYLE: At that time,
11 there was five of them that were
12 hot. Boiling, he said.

13 Are they still boiling?

14 MS. O'CONNELL: We're
15 looking at drinking water standard
16 for lead of is five parts per
17 million, and drinking water
18 standard for cadmium is four parts
19 per million. There are a number
20 of wells that are significantly
21 above that, and there's going to
22 be a cleanup action.

23 But what Theresa was showing
24 you is there's a trend. We've
25 been sampling since the eighties a

1 number of wells all around the
2 site, and the trend we're seeing
3 is the pH -- which is how acidic
4 the groundwater is -- was brought
5 down very low, very, very low pH
6 because it's very acidic from the
7 operations at the site. And that
8 was allowing the lead --

9 MR. KYLE: I don't have to
10 hear any more of that.

11 If this is still a Superfund
12 cleanup job, why don't they get
13 rid of the dump?

14 As long as that dump is
15 there, you're still going to have
16 contamination as long as it's
17 there.

18 MS. O'CONNELL: The dump is
19 contained and the leachate is
20 collected. So, that means that --

21 MR. KYLE: You think it's in
22 that one spot all the time?

23 MS. O'CONNELL: It's capped,
24 and any contamination that's
25 running off is collected.

1 MR. KYLE: How often do they
2 pump those wells?

3 MS. O'CONNELL: This is
4 under State authority. We can get
5 more details on that.

6 MR. KYLE: How often are
7 they testing?

8 How many of these residents
9 know that?

10 MS. O'CONNELL: This is not
11 part of the Superfund action.

12 We're dealing with the
13 groundwater contamination that
14 originated at the facility, was
15 flowing towards the landfill and
16 is still present there, although
17 the area of contamination has
18 decreased over time because of
19 natural processes. There's still
20 significantly elevated
21 contamination --

22 MR. KYLE: So, this meeting
23 don't have anything to do with the
24 dump itself, just surface water?

25 MS. HWILKA: The

1 groundwater.

2 If what you're saying is you
3 think that something is leaching
4 beneath the landfill into the
5 groundwater --

6 MR. KYLE: We know it is.

7 MS. HWILKA: Well, what Kim
8 is saying is anything coming from
9 beneath the landfill is collected,
10 put in a tank, and then they pump
11 it out --

12 MR. KYLE: What about all
13 the water underneath the landfill
14 that's going down into the
15 aquifer?

16 MS. HWILKA: All of these
17 pink dots are all of our well
18 network for the whole Superfund
19 site. So, we monitor these, and
20 that's how we delineated our
21 plume.

22 So, the area that we're
23 treating includes the groundwater
24 beneath the landfill.

25 MR. KYLE: And you think

1 it's stopping right there, it's
2 not going on down?

3 MS. HWILKA: I'm not sure I
4 understand.

5 MR. KYLE: The point I'm
6 trying to get across to you people
7 is as long as that landfill is
8 there, you're gonna have this
9 problem I don't care what you do
10 here.

11 I've worked in this work for
12 years. Not just up here, I've
13 worked over in a big dump, 68
14 acres, for a while, and you have
15 nothing but problems.

16 You got to get rid of that
17 dump.

18 MS. O'CONNELL: I guess your
19 comment is that that dump, the
20 landfill, is continuing to act as
21 a source --

22 MR. KYLE: Yes, and always
23 will.

24 MS. O'CONNELL: But we're
25 seeing something different than

1 that.

2 The landfill leachate --
3 what's contaminated in the
4 landfill is collected. It's not
5 allowed to go into the
6 groundwater, it's collected.

7 So, we don't see that as a
8 primary source. If it became a
9 source, we would see it by our
10 long-term groundwater monitoring.
11 You'd start to see the levels
12 going up. The levels around the
13 landfill --

14 MS. HWILKA: Are going down.

15 MS. O'CONNELL: -- the
16 levels of contamination in the
17 groundwater are going down.

18 MR. KYLE: I have one more
19 question.

20 When this project was going
21 on, they tore down the buildings,
22 got rid of the slag piles and the
23 conveyors, and this and that. I
24 remember in the paper it said
25 stage two of this cleanup job was

1 to take eighteen inches of soil
2 off the 44-acre site to get rid of
3 all contamination and then test
4 the soil. And if there was still
5 a radius of contamination, they
6 would take more.

7 I've lived here for 21 years
8 in this township, and I've never
9 seen that done.

10 MS. HWILKA: Well, the soil
11 went with operable unit two, I
12 assume is probably what you're
13 referring to. They did excavate
14 the area.

15 Let me go back to the map.

16 MR. KYLE: They only
17 excavated where the buildings
18 were.

19 MS. HWILKA: Hold on one
20 second. Let me go back.

21 MR. KYLE: I'm bringing this
22 up for the residents. I live a
23 mile from here. It don't bother
24 me.

25 MS. HWILKA: So, they

1 excavated soil. This is where the
2 gross contamination was.

3 MR. KYLE: You're pointing
4 around the whole 44 acres?

5 MS. HWILKA: This is the
6 former facility area where the
7 contamination was found. They
8 also removed sections of the east
9 stream and the west stream.

10 MR. KYLE: That was
11 afterwards.

12 MS. HWILKA: Right, but that
13 was part of the next phase.

14 MR. KYLE: That was because
15 the residents in that area had bad
16 water.

17 MS. HWILKA: So, during the
18 Remedial Investigation, we don't
19 just sample right here, we sample
20 further out until we get to areas
21 where we don't find contamination,
22 and that's how you determine the
23 extent.

24 Then what they did was they
25 found that the area that had the

1 contamination above five hundred
2 parts per million of lead was in
3 this area here as well as part of
4 this stream and here. And those
5 were excavated.

6 MR. KYLE: When is Superfund
7 going to finish this project?

8 MS. HWILKA: That's what
9 we're trying to do with the
10 groundwater.

11 After the operable units are
12 done -- like operable unit two,
13 after they excavated, they do have
14 to do confirmatory samples. So,
15 that's when they go back and --

16 MR. KYLE: Going to take the
17 dump out?

18 MS. HWILKA: No.

19 They went back and they did
20 confirmatory samples and --

21 MR. KYLE: You people are
22 wasting your time until you get
23 rid of that dump. It's a fact.

24 MS. HWILKA: Well, we've
25 noted that.

1 MR. KYLE: Okay.

2 MS. DOLBOW: I have a
3 question. I'm Jaime Dolbow.

4 You're talking about -- say
5 that's your hot spot.

6 I want to know, how far out
7 a radius have you tested the
8 wells?

9 MS. HWILKA: For the
10 groundwater?

11 MS. DOLBOW: You're talking
12 about right now -- like, say
13 that's your hot spot right now.

14 How far out in a radius have
15 you tested well water in general?

16 MS. HWILKA: Well water, let
17 me go back to that figure a
18 second.

19 This is our current well
20 network, but what we did is --

21 MS. DOLBOW: I mean off the
22 site.

23 MS. HWILKA: Right.

24 So, what we did was we
25 delineated the plume. So, we go

1 out until we hit a clean zone.
2 So, if you remember -- let me go
3 back just as an example.

4 We have wells up here and
5 you know there are wells that were
6 monitored. So, this is where we
7 determined the extent of the
8 contamination. Beyond that, clean
9 groundwater was found.

10 So, that's how we -- we go
11 out until we hit clean groundwater
12 that meets the drinking water
13 standards.

14 MS. DOLBOW: How often is
15 that tested?

16 Because your aqueduct can
17 change flow at any point in time.

18 MS. HWILKA: Right.

19 Groundwater flow is very
20 slow, and we've been monitoring
21 these over time. I just showed
22 you the most recent data was 2004,
23 2007, 2010.

24 And that's where we're
25 seeing the contamination, only in

1 this general vicinity. But we
2 monitor all these wells when we go
3 out and sample.

4 And as part of this
5 groundwater remedy, we would start
6 off with either twice-a-year
7 monitoring or once-a-year
8 monitoring to get our data. But
9 right now, what we're seeing is
10 contamination only in these areas.

11 These wells up here, you
12 know, have now met -- you know,
13 the contamination has decreased to
14 the point where they're meeting
15 drinking water standards. That's
16 why the residents along Route
17 130 -- that's why we have the
18 wells here, to ensure that these
19 remain clean.

20 And that's why we also
21 couple it with --

22 MS. DOLBOW: What about
23 going the other way?

24 You keep mentioning going
25 towards 130.

1 What about residents on the
2 other side?

3 MS. HWILKA: Towards
4 Benjamin Green Road?

5 MS. DOLBOW: In general.

6 MS. HWILKA: Well, in
7 general -- again, this is the area
8 we have exceedances above the
9 drinking water standards. So,
10 these wells are outside now in the
11 sort of clean zone. So, we know
12 that the plume is only here. It's
13 not spread beyond these wells
14 because these wells are clean.

15 And, also, it's important to
16 note that groundwater flows
17 towards the west stream. It flows
18 in a westerly direction. And that
19 makes sense when you see, you
20 know, these wells, the residential
21 wells have been sampled and have
22 not had, you know, concentrations
23 above the drinking water standard,
24 because, again, this unconfined
25 aquifer -- groundwater flows -- I

1. don't know the flow rate right
2 offhand, but it flows very slowly
3 and it flows towards the west.

4 So, if you had
5 contamination, it's not going to
6 be flowing really radially out.
7 It flows in the general direction
8 towards the west stream.

9 But, basically, again, we
10 test wells further out until we
11 hit a clean zone. Once we hit the
12 clean zone perimeter, we know
13 that --

14 MS. DOLBOW: Is that just on
15 the property you're testing or
16 you're you going out to, like,
17 Pennsgrove --

18 MS. HWILKA: No, we've only
19 gone out to here because that's
20 where we found the clean area.
21 So, we know that the groundwater
22 contamination is within this area.

23 If these wells were above
24 the drinking water standards, we
25 would have to put more wells and

1 we would have to keep going out
2 until we hit a clean zone.

3 MS. DOLBOW: Okay.

4 MS. HWILKA: So, that's how
5 we go about what we call
6 delineating our plume.

7 MS. DOLBOW: I also have a
8 question about alternative three
9 you talked about.

10 You're putting another
11 chemical agent or something into
12 the water to collect the
13 contaminants to bind them.

14 Right?

15 MS. HWILKA: The reagent
16 that would go in is not a toxic
17 reagent.

18 MS. DOLBOW: Right.

19 MS. HWILKA: So, it would
20 then go in and it would bind with
21 the metal --

22 MS. DOLBOW: And it settles
23 to the soil.

24 MS. HWILKA: Yes, it would
25 adhere to the soil.

1 MS. DOLBOW: Are you going
2 to clean it out or are you going
3 to leave it?

4 MS. HWILKA: No, it stays in
5 place because what it does is it
6 binds the soil. So, it's still in
7 the aquifer, but it's no longer in
8 the groundwater flow.

9 And in order for it to
10 desorb or something to that
11 effect, you'd have to have really,
12 really low pH, like a pH of one or
13 two, and that's not what we're
14 going to be seeing here because
15 already the pH is rising because
16 we've removed the source material
17 and clean groundwater is flowing
18 in.

19 So, the pH over time has
20 gone from, you know, a pH of two,
21 three, and now it's coming up more
22 towards four, towards five. So,
23 even at this current pH, you
24 shouldn't see desorption of these
25 metals.

1 MS. DOLBOW: In how many
2 other areas or cases has this
3 alternative three been used and
4 been successful?

5 Is there any kind of study
6 on that?

7 MS. HWILKA: Other sites
8 have used reagent injection.

9 Do you know any offhand I
10 can reference?

11 MR. SKORKA: I don't know
12 specific offhand.

13 MS. HWILKA: But there are
14 studies. It's a proven
15 technology.

16 MS. DOLBOW: It is proven
17 that it isn't going to cause any
18 further damage to the environment
19 or to us around here?

20 MS. HWILKA: Right, because
21 we're not putting another toxic
22 substance in. We're putting it in
23 to remove the contaminants. And
24 the amount --

25 MR. KYLE: Would you drink a

1 glass of that stuff?

2 MS. HWILKA: Not right now
3 because it's not meeting the
4 drinking water standard, but after
5 I would drink it.

6 MR. KYLE: When they put
7 that in the ground, would you
8 drink a glass of that?

9 MS. HWILKA: Yes, because
10 once you inject the reagent, it's
11 removing the contaminants. And we
12 monitor it. And once we see that
13 it's met the drinking water
14 standards -- it's not happening
15 overnight. It's going to take
16 about ten years. You're cleaning
17 gallons and gallons of
18 groundwater.

19 So, once you reach that
20 level where we monitor and see
21 that it's now met the drinking
22 water standards, then it's clean.

23 But right now, no one can
24 use any water from these wells.
25 It's going to be restricted

1 because it's not safe to drink.

2 MS. DOLBOW: Is that stuff
3 ever going to break down or remix
4 with the water?

5 How long of a shelf life is
6 that going to last?

7 MS. HWILKA: The reagent
8 itself isn't what we're talking
9 about. What we're talking is the
10 adsorption, is that going to last,
11 because that's what we want to
12 know, is the contamination going
13 to remain enforce?

14 So, that's what we're saying
15 is once it does adsorb the surface
16 of the soil, it's rather permanent
17 because it would take a very low
18 pH to desorb it. It would take
19 all these extreme conditions that
20 created the problem to begin with,
21 with all this acid and low pH.
22 That's what causes metals to go
23 into solution. But in a normal pH
24 level, anything that's adsorbed
25 should remain adsorbed.

1 And that's why we monitor.
2 We're not just going to all of a
3 sudden say oh, we have one clean
4 and now we're going to --

5 MS. DOLBOW: How long is the
6 monitoring stage?

7 MS. HWILKA: So, it will be
8 monitored until we get to those
9 cleanup standards.

10 MS. DOLBOW: Say ten years
11 from now, you have it all under
12 control, drinking water standards
13 have been met.

14 How long after ten years is
15 that going to be monitored?

16 Or are you just going to
17 walk away from it?

18 MS. O'CONNELL: Two points.

19 After the remedy is
20 selected, if the reagent injection
21 is the alternative that's
22 selected, we will use our
23 enforcement tools to get the
24 private parties to do the work
25 under our oversight. There will

1 be a consent decree, negotiations,
2 a legal agreement.

3 And as part of the
4 agreement, they're going to be
5 required to do a treatability
6 study. So, that means that they
7 would be going into a small area
8 and they would be actually doing
9 this initially and collecting a
10 lot of data before it's done
11 sitewide to make sure that all the
12 details -- that it's working and
13 all of the details are correct and
14 we have the correct reagent.

15 And, you know, the point is
16 to find out how much to put in and
17 how close to inject it so it's
18 effective. So, a lot of details
19 of the engineering design of how
20 it will be done will be developed
21 during an engineering design
22 phase.

23 And always with groundwater
24 remedies, whenever we meet our
25 goal, there's a number of years --

1 generally it's three to ten
2 years -- after all standards have
3 been met before we walk, before we
4 are satisfied.

5 And monitoring will be going
6 on at some frequency -- I'm not
7 sure what frequency -- for at
8 least five to ten years after
9 standards have been met and
10 possibly more, if necessary, on
11 that site, but generally never
12 less than that.

13 So, there will be a number
14 of years of sampling after the
15 standard is met to determine that
16 it's been met for a number of
17 years and that it's stable.

18 MS. DOLBOW: During this
19 time in the cleanup, you'll be
20 continuing to test wells during
21 those monitoring stages and test
22 all the monitoring wells on the
23 property?

24 MS. O'CONNELL: This
25 alternative would require

1 extensive sampling throughout.
2 You sample before you start
3 reagent injection, you sample
4 during, and you sample after.

5 And you do a trend analysis.
6 And what you expect to see is
7 where you injected first in that
8 vicinity high, you expect to see
9 it go down over time. So, there
10 will be extensive groundwater
11 sampling before, during, and after
12 the remedy.

13 MS. HWILKA: It's not just
14 the wells from that tiny little
15 hot spot. We still monitor all
16 the wells.

17 MS. O'CONNELL: And
18 additional wells may be added.
19 We'll make sure that there's no
20 area that we want to monitor
21 that's not covered. We can add
22 additional wells if necessary.

23 MS. DOLBOW: Thank you.

24 MR. MILLER: Will Miller.
25 I spoke with you earlier

1 about this. The Army Corps of
2 Engineers about a year ago put in
3 approximately eight monitoring
4 wells because they found lead on
5 their property, which is -- that
6 leads off of that west stream
7 going down through on the other
8 side of Route 130.

9 I'm wondering, has EPA been
10 in contact with the Army Corps?

11 Have you gotten the sample
12 results?

13 MS. HWILKA: Yes.

14 MR. MILLER: Have they been
15 determined to be from this site or
16 from dredge materials?

17 MS. HWILKA: Well, there's
18 two things going on.

19 And Mike, you might want to
20 address this.

21 There's the groundwater
22 monitoring wells that they put in
23 and that groundwater monitoring
24 report. Initially, they wanted to
25 make sure that our plume wasn't

1 coming beyond Benjamin Green Road,
2 and they put a few other wells in.

3 And I can follow up with you
4 on this, but from our initial look
5 at the data, they weren't finding
6 what they thought they would.
7 They were finding levels below the
8 drinking water standards in the
9 groundwater wells.

10 And then they also were
11 sampling north of Route 130 in the
12 sediment. So, not wells, but they
13 took a few sediment samples. And
14 they said they found some
15 additional lead. So, that's
16 something that we need to go and
17 we need to coordinate with them
18 and look at their data for the
19 sediment portion.

20 But that's in their drainage
21 channel. So, we need to look at
22 that.

23 MR. MILLER: It's only
24 common sense that if you have a
25 source, you would expect to see

1 the lead decreasing as you go out
2 from that source.

3 Is it possible that you
4 could get pockets of lead that
5 transmitted outside of that --
6 your boundary there, your 13, 14,
7 15, 16, 17 wells outside of that,
8 before you started monitoring?

9 MS. HWILKA: These were the
10 wells that ended up in the
11 network, but during the Remedial
12 Investigation there were
13 additional samples taken beyond
14 this. I don't know offhand
15 where -- oh, sorry, that was
16 sediment.

17 But for here, no, we don't
18 believe that there's another
19 pocket. The Corps did put
20 additional wells in, but they're
21 not finding the levels of
22 contamination that we have on our
23 site.

24 MR. MILLER: I know they're
25 pointing here.

1 MS. HWILKA: Yes.

2 We are in contact with the
3 Army Corps.

4 MS. O'CONNELL: See those
5 three wells? Those three wells
6 are cleaned. And then we've
7 sampled I don't know how many, six
8 or seven or eight wells along
9 Route 130, private wells, private
10 residential wells.

11 So, those depths might vary,
12 but those wells have never been
13 impacted by the site. So, the
14 site contamination, you know, has
15 never gone beyond that, so we
16 don't believe that -- if there's
17 lead contaminants, we don't
18 believe it's circulated.

19 But we're planning to sit
20 down and go over all the Corps
21 data with them.

22 MR. MILLER: Okay.

23 MS. O'CONNELL: The sediment
24 might be a different story because
25 the sediment contamination did

1 move in the stream.

2 MR. MILLER: This stream
3 runs all the way to 130, right.

4 MS. O'CONNELL: And if
5 they're finding some additional
6 lead, we'll be looking at that and
7 meeting with them on that.

8 But we don't believe that
9 the lead in the groundwater, lead
10 contamination in the groundwater
11 is -- right now, it's all
12 contained on site.

13 And, also, I think Theresa
14 made this point. The trend we're
15 seeing is it's contracting. The
16 plume is actually getting smaller
17 over time through natural
18 processes. And, so, that will be
19 augmented if we implement the
20 reagent injection alternative.

21 MR. DANSOME: I have a
22 question. My name is Earl
23 Dansome. I'm a resident.

24 In the nineties, there was a
25 determination made and it was

1 implemented. So, I guess my
2 concern is that now we're 27 years
3 later and we're still on the same
4 page as far as trying to determine
5 what to do.

6 I'm concerned, is there a
7 problem that -- and then the
8 communication has been that things
9 are getting better, but, you know,
10 all of a sudden there's an issue
11 here.

12 MS. HWILKA: What we're
13 finding out is -- so, we selected
14 a remedy in 1994 for the soil, the
15 sediment, as well as the
16 groundwater. So, we dealt with
17 the immediate public health
18 concerns first, which were the
19 soil and the sediment and direct
20 exposure from the smelting
21 operation.

22 So, while we were taking
23 care of that portion, we did
24 select pump and treat as a remedy,
25 but we hadn't yet implemented it,

1 but we were monitoring the
2 groundwater. While we were taking
3 care of all the soil and sediment
4 portion of the site, we were
5 monitoring the groundwater.

6 So, we only relatively
7 recently completed all of that
8 soil and sediment activity. So,
9 now we're focusing back on the
10 groundwater. And because we have
11 this dataset now from, you know,
12 the late eighties to 2010 on the
13 groundwater and we're seeing this
14 decreasing trend, significantly
15 decreased concentrations, you know
16 pump and treat may not be the way
17 to go.

18 It's going to take more than
19 fifty years to reach the cleanup
20 standard. You have to construct a
21 treatment plant, so that's added
22 construction cost and time. And
23 now there are other technologies,
24 such as this reagent injection,
25 that can more efficiently,

1 effectively, address the amount of
2 contamination that we have now.

3 So, that's what we
4 evaluated. It's not so much that
5 there was a problem with the
6 remedy, it's just that at this
7 point, now that we have all this
8 other data, we don't really feel
9 we need to go through this whole
10 treatment plant construction and
11 fifty years' worth of treatment
12 when there's another technology
13 available that's just as
14 effective, if not more effective,
15 and takes less time and less
16 money.

17 So, that's why we're here
18 today, to say: Well, let's think
19 about it and see if we can
20 implement a remedy using this
21 newer technology with less cost,
22 less time, same effectiveness.

23 MR. DANSOME: Federal taxes
24 are what is used to fund this?

25 MS. HWILKA: No.

1 As Kim stated, the
2 responsible parties for the
3 site -- not the Government, those
4 who were involved with NL
5 Industries -- they're the ones
6 that are paying for the cleanup
7 and they're performing the work.

8 And as a federal agency,
9 what our job is is oversight of
10 the activities. So, any work
11 plans that are developed are
12 reviewed by EPA. All the designs
13 are reviewed by EPA as well as New
14 Jersey Department of Environmental
15 Protection.

16 So, the PRP group has to
17 meet these state and federal
18 cleanup standards. So, they have
19 to meet our standards, but it is
20 being paid for by the PRP group,
21 not EPA.

22 MR. DANSOME: One final
23 question. Mortality rate.

24 Has there been any study or
25 anything with regards to this

1 general area here or this region
2 or South Jersey with regard to
3 mortality rate?

4 MS. HWILKA: I don't know in
5 general mortality rate.

6 We did our risk assessment
7 based on site-related contaminants
8 to evaluate.

9 MS. O'CONNELL: The ATSDR,
10 New Jersey Department of Health,
11 usually looks at that type of
12 thing, health effects in large
13 areas which may have a number of
14 different impacts. So, I'm not
15 aware that they have looked at
16 that.

17 What we look at is current
18 and future risks posed by
19 contamination at just this site.
20 So, right now the risks that we're
21 concerned about is the future --
22 right now, nobody's drinking the
23 groundwater that's contaminated
24 from the site, but there is
25 potential for someone to drink

1 that in the future, someone to
2 become exposed to this
3 contaminated groundwater in the
4 future.

5 So, that's what's driving
6 our cleanup. Again, there's not a
7 current risk.

8 MR. DANSOME: You say
9 future.

10 Isn't this the future?

11 This is 27 years out.

12 MS. HWILKA: In terms of
13 what Kim is saying is because
14 right now no one is drinking the
15 contaminated groundwater.

16 So, we have to clean this
17 up. This is in a class two
18 aquifer for New Jersey, so that
19 means it's supposed to be for
20 potable drinking water use. So,
21 because this area is contaminated,
22 no one's allowed to drink water
23 from this section.

24 So, what we're saying is we
25 need to clean it up to restore it

1 to drinking water standards so if
2 in the future someone wants to use
3 well water from this area, they'd
4 be able to because it's been
5 cleaned.

6 So, right now, no one's
7 being directly exposed to it, so
8 that's what Kim's referring to as
9 future use. If someone were to
10 come in and develop the site -- I
11 think it's zoned commercial right
12 now, but say in the future it
13 became residential and they were
14 on well water, this water has to
15 be cleaned before anyone can drink
16 it; otherwise, if it's
17 contaminated, they have an
18 unacceptable risk.

19 So, that's why we continue
20 to monitor the site as well as the
21 residences, to make sure that that
22 contamination isn't flowing into
23 someone who's using it as drinking
24 water.

25 MFI. KYLE: I have one more

1 question.

2 From the original demolition
3 work and stage two cleanup -- and
4 I'll mention this again -- they
5 were supposed to take eighteen
6 inches of material off that whole
7 site and test it then.

8 And if they would have done
9 that, if they would have done that
10 and replaced it with clean soil,
11 eighteen inches of new clean soil,
12 would we be here today?

13 MS. O'CONNELL: Do you have
14 the volumes?

15 MS. HWILKA: Yes.

16 MS. O'CONNELL: We didn't
17 select --

18 MR. KYLE: Where is the
19 contaminated groundwater coming
20 from?

21 MS. O'CONNELL: It's coming
22 from the former source that's all
23 been removed.

24 We did not select -- we
25 don't select a remedy that says

1 remove eighteen inches --

2 MR. KYLE: That's what was
3 in stage two in the paper.

4 MS. O'CONNELL: We selected
5 a cleanup number. The cleanup
6 number for lead in soil is five
7 hundred parts per million. We
8 determined that anything that's
9 greater than that needs to be
10 removed from site as a potential
11 risk if you get exposed to it or
12 to groundwater.

13 MR. KYLE: Those slag piles
14 was 250, 225 parts per million and
15 you took that out.

16 MS. O'CONNELL: They were
17 all removed from the site --

18 MR. KYLE: All removed.

19 MS. O'CONNELL: All the
20 soils above the cleanup standards
21 for this site, 500 parts per
22 million of lead, all of it,
23 regardless of whether it was at
24 18, 24, 6, wherever it was, it was
25 removed from the site. It was

1 excavated --

2 MR. KYLE: The whole site
3 was done?

4 MS. O'CONNELL: Yes.

5 MR. KYLE: And then
6 replaced?

7 MS. O'CONNELL: There's no
8 more source material.

9 MR. KYLE: It's been
10 replaced with new soil?

11 MS. O'CONNELL: Yes.

12 MR. KYLE: Why are we having
13 a problem?

14 MS. HWILKA: Because
15 initially, when that slag material
16 was sitting there, as you're
17 saying, it doesn't just stay there
18 at the time. For all the years
19 when this facility was operating,
20 metals and contaminants leached
21 through the soil --

22 MR. KYLE: How far down do
23 you think it went?

24 MS. HWILKA: Well, we know
25 it went to groundwater. That's

1 the unconfined aquifer that's --

2 MR. KYLE: Oh, now, stage
3 two said they was supposed to take
4 eighteen inches off the soil, and
5 if it was still high, take more
6 off.

7 MS. HWILKA: Which they did.

8 But this leaching process
9 had already occurred. So, the
10 contaminants that had been sitting
11 there from 1972 --

12 MR. KYLE: So, they put all
13 new back in?

14 MS. HWILKA: The site was
15 regraded with new soil.

16 MR. KYLE: With all new
17 soil.

18 If they took thirty inches
19 off, they put thirty inches back?

20 MS. O'CONNELL: Yes.

21 MR. KYLE: And we still have
22 problems.

23 MS. HWILKA: Because that
24 was there before.

25 MS. O'CONNELL: When the

1 source was sitting there -- the
2 facility operated for years. The
3 source was sitting there. And
4 while the facility was operating,
5 contamination was placed on the
6 ground uncontrolled and it
7 migrated down to the soil --

8 MR. KYLE: You're saying the
9 contamination is coming back up.

10 MS. O'CONNELL: No, I'm not
11 saying that.

12 MR. KYLE: Well, it's what
13 you're saying.

14 MR. SKORKA: Part of the
15 contamination had the acid from
16 the batteries. So, the acid
17 dropped the pH levels down to two
18 or two and a half. That is when
19 lead and other metals can be
20 mobilized more easily, at the
21 lower pH.

22 MR. KYLE: But all that was
23 supposed to be taken out.

24 MR. SKORKA: We didn't
25 remove groundwater soils. We only

1 removed the dry soils. So, in the
2 groundwater, you still have these
3 low pHs.

4 MR. KYLE: Every time the
5 water table comes up, so do the
6 contaminants.

7 MR. SKORKA: Well, the
8 contamination is there. We still
9 have low pH.

10 So, one of the things we
11 think of being done is we would
12 add a chemical to raise the pH to
13 more of a neutral level. That
14 will, hopefully, facilitate the
15 adsorption.

16 MR. KYLE: What do these
17 farmers around here do when you
18 put all the chemicals in the
19 ground?

20 When they grow stuff,
21 there's not supposed to be any
22 chemicals in the water that
23 they're pumping out of the ground.
24 It goes to these vegetables.

25 I'm surrounded by water.

1 MS. HWILKA: But this is
2 only on treating the water in the
3 unconfined aquifer on the site.

4 MR. KYLE: That water's
5 running down the aquifer.

6 MS. HWILKA: And it's
7 reacting. So, once it's --

8 MR. KYLE: People's wells
9 are pumping it back up.

10 MS. HWILKA: People's wells
11 are not pumping from this site
12 right now.

13 MR. KYLE: Okay.

14 MS. HWILKA: So, what we do
15 is we add these chemicals that
16 raise the pH. And once your
17 chemicals are reacting, they're
18 reacting. They're not just free
19 flowing.

20 That's why we also do
21 monitoring and why we have a
22 treatability study, so that we can
23 determine the right concentrations
24 to add just enough that are going
25 to react with all of our

1 contaminants to remove the
2 contaminants.

3 And then there'd be --

4 MR. KYLE: Again, will you
5 drink a glass of that?

6 MS. HWILKA: Once it meets
7 drinking water standards, I would
8 drink a glass of that.

9 That's why no one is allowed
10 to drink this water right now,
11 because it doesn't meet the
12 standards. And that's why we're
13 here today, is because we want to
14 clean it up so that it can be
15 restored because those are the
16 regulations and so no one would be
17 directly exposed to contaminated
18 drinking water for future use.

19 MR. KYLE: Are you the
20 representative for NL?

21 MR. SKORKA: No, I'm with
22 the EPA, hydrogeologist.

23 MR. KYLE: Don't you work
24 for the State?

25 UNKNOWN SPEAKER: Are the

1 wells screened at different
2 levels?

3 MR. SKORKA: EPA.

4 MS. O'CONNELL: We're
5 federal, EPA.

6 MS. HWILKA: Yes, the wells
7 are screened at different levels.

8 That's, again, when we did
9 our delineation, that's how we
10 determined it was in the
11 unconfined aquifer. And then we
12 do have wells screened at
13 different portions of the aquifer
14 to ensure that that whole area is
15 clean.

16 MS. DOLBOW: Even in your
17 outer perimeters, you have deep
18 and shallow?

19 MS. HWILKA: Yes, we have
20 shallow and deep. That's why
21 there are wells that are coupled
22 together; they're screened at
23 different levels all around the
24 site.

25 MR. NIPE: Ron Nipe.

1 When you started the
2 process, how deep did you put your
3 bores?

4 How deep is the
5 contamination?

6 MS. HWILKA: For the
7 sediment and soil, I don't know
8 offhand initially from the RI, but
9 we can --

10 MS. O'CONNELL: The water
11 table was sometimes at five feet.
12 We went down to eight feet --

13 MR. NIPE: The water's in
14 the soil.

15 MS. O'CONNELL: Right.

16 MR. NIPE: How deep did you
17 do your bore before you ran into
18 contamination?

19 MS. O'CONNELL: When we
20 decided we would remove the soil,
21 you mean?

22 MR. NIPE: Yeah.

23 MS. O'CONNELL: We went down
24 to the water table as necessary.
25 We stopped at the water table

1 because then that's a groundwater
2 issue here.

3 So, we went down fairly
4 shallow. It was fairly shallow,
5 maybe five to ten feet, depending
6 on where you were at the site.
7 But we didn't necessarily even go
8 down to the water table if it was
9 clean. We went down until it was
10 clean or we hit water.

11 And we removed all the
12 unsaturated soils that were above
13 five hundred parts per million.

14 MS. HWILKA: And then the
15 groundwater monitoring wells go
16 deeper, and the groundwater remedy
17 is what we're looking at here.
18 That's what this comment --

19 MR. NIPE: How deep in the
20 soil, how deep in this underground
21 does the contamination go?

22 MS. HWILKA: Right now, we
23 have contamination in the
24 unconfined aquifer that's about
25 twenty feet in thickness.

1 MR. NIPE: So, you have
2 contamination twenty feet deep.

3 MS. HWILKA: In the
4 groundwater --

5 MR. NIPE: In the
6 groundwater.

7 MS. HWILKA: -- that we're
8 addressing --

9 MR. NIPE: The aquifers in
10 this part of country come from the
11 Pocono mountains and runs to the
12 ocean.

13 MS. HWILKA: Right.

14 And the contamination that
15 we're seeing is isolated to the
16 area beneath the former facility.
17 That's why we have that extensive
18 well network and we sampled
19 radially out and saw that we
20 eventually reach a point of clean
21 groundwater, again, screened at
22 different depths so we know we've
23 reached a clean zone. And that's
24 how we knew that the contamination
25 was confined to the area around

1 where the former facility is.

2 So, we did look at different
3 depths, we've determined that the
4 contamination is within the
5 unconfined aquifer that's roughly
6 twenty feet thick, and we have a
7 well network of 28 wells screened
8 at different depths, and we
9 determined how far out the
10 contamination went.

11 As we said, over time the
12 contamination plume has shrunk and
13 we really only seen contamination,
14 again, in the area by the former
15 facility.

16 So, while I understand what
17 you're saying, groundwater does
18 flow through and it flows through
19 towards the Delaware River
20 eventually, but our contamination
21 is only localized to this one
22 area, and that's the area that
23 we're cleaning.

24 And, again, groundwater
25 doesn't flow at a rapid pace. And

1 as it sits there, natural
2 processes have already been
3 working to reduce the contaminants
4 through natural processes, that
5 adsorption process.

6 MR. MILLER: Bill Miller.

7 I assume you're going to
8 inject, like, a base material to
9 counteract with the acid.

10 When would you expect to see
11 the levels start to drop.

12 A year? Two years? Six
13 months?

14 MS. HWILKA: You mean the pH
15 levels?

16 MR. MILLER: The pH.

17 MS. HWILKA: Well, we're
18 going to be doing a treatability
19 study --

20 MR. MILLER: Actually, pH
21 rise.

22 MS. HWILKA: Yeah.

23 We're going to be doing a
24 treatability study first, so
25 that's when we're going to

1 determine -- you know, it's
2 already acidic. So, by adding the
3 base, that's what is reacting, and
4 it will neutralize the
5 groundwater.

6 So, in terms of how long it
7 takes, that part would be part of
8 our treatability study. And our
9 remedial design is to determine
10 what's our volume of
11 contamination, and we know the pH,
12 and then we would calculate how
13 much base we need to add to
14 neutralize that pH to bring it up
15 to around pH five or six.

16 MR. MILLER: Then you have
17 to allow travel from here to here,
18 or are you going to actually add
19 more injection wells?

20 MS. HWILKA: There are
21 already multiple injection wells,
22 and that also is part of the
23 remedial -- the design phase, is
24 determining where to put those
25 injection wells to get at that

1 pocket of contamination.

2 MR. MILLER: So, that should
3 happen pretty quickly, I would
4 think.

5 MS. HWILKA: That portion
6 should be relatively short, you
7 know, raising the pH. And then we
8 would inject the reagent.

9 So, then, by having the
10 higher pH, it fosters that
11 adsorption reaction, that more
12 complex one that's more permanent.

13 MS. O'CONNELL: What might
14 take longer is the engineering
15 design.

16 MS. HWILKA: Right.

17 MS. O'CONNELL: We're going
18 to do a treatability study in one
19 small area and collect data.
20 That's going to help us determine
21 how many injection points we
22 need --

23 MS. HWILKA: Where we need
24 them.

25 MS. O'CONNELL: -- how much

1 pH we need, how high the pH will
2 go. So, that may take some time.
3 But once we have the answers for
4 that, we'll be able to design a
5 system that will be effective.

6 So, we'll be doing it on a
7 pilot on a small scale first and
8 then we'll be refining the details
9 of how best to implement it and
10 then --

11 MR. MILLER: What happens if
12 you overshoot and go to the
13 caustic side of things?

14 What kind of effects does
15 that have on the metals there,
16 any?

17 MS. O'CONNELL: We're not
18 looking to raise the pH above
19 what's natural here, which natural
20 pH is a little low here, about
21 five or six.

22 MS. HWILKA: It would be
23 raised slightly above initially to
24 foster this reaction, but then all
25 of that would be -- but the thing

1 to remember is that we're still
2 monitoring the whole well network,
3 so we'll be able to see if the pH
4 remains too high or something like
5 that.

6 But given the current site
7 conditions, we don't anticipate
8 that will happen, but that's why
9 we do monitor and why we have the
10 treatability study. So, if
11 anything, probably you wouldn't
12 overshoot initially. You might
13 start off slow, see how that works
14 first, and then move forward from
15 there.

16 MR. NIPE: Is this a proven
17 design or are you hoping it will
18 work?

19 MS. HWILKA: No, no, reagent
20 injection has been used.

21 MR. NIPE: There's lead
22 sites all over the country.

23 Is it working someplace
24 else?

25 MR. SKORKA: I believe it

1 has, yes.

2 MS. HWILKA: I don't have a
3 site offhand, but, yes, there has
4 been documentation, there are
5 studies that have been done --

6 MR. NIPE: You have one ten
7 miles down the road that I know is
8 just as bad as this, if not worse.

9 MS. HWILKA: Well, I'm not
10 sure what site that is, but we do
11 have studies for reagent injection
12 for use with metals, and that's
13 why we actually started looking at
14 this, because it seemed to be more
15 efficient and effective and more
16 permanent, you know, again, taking
17 less time to achieve the same
18 goal.

19 And, again, we're not just
20 throwing stuff into the ground.
21 As Kim O'Connell stated, we have a
22 treatability study where we will
23 be testing. And you know what?
24 If it doesn't work, we're not
25 going to do it if it doesn't work.

1 You know, we would re-evaluate
2 things.

3 But that's the whole point.
4 The treatability studies are done
5 for multiple sites for multiple
6 reasons for multiple media. It's
7 just a way to initially evaluate
8 what we do and then scale it up
9 from there.

10 MS. COY: Susan Coy.

11 I live across from the site
12 on Route 130 and Railroad Avenue.
13 The site is right across the
14 street from where I live. I have
15 to drill a new well.

16 How do I know that it will
17 be safe?

18 Right now, I spend \$1,200 a
19 year on drinking water from Deer
20 Park because the water is so
21 acidic.

22 MS. HWILKA: Well, I know
23 Railroad Avenue is a little
24 further east than where we've been
25 sampling.

1 MS. COY: It's also west.

2 How do I know after spending
3 \$6,000 to drill the well that it
4 will be safe?

5 MS. O'CONNELL: We're not
6 sure what the pH will be. The pH
7 is a little low here, but that's
8 the natural pH in this area.

9 MS. COY: I have health
10 concerns.

11 MS. O'CONNELL: That's not
12 related to the site, that's the
13 natural condition of the area.
14 The pH is further lowered on the
15 site because of activities on the
16 site.

17 But there are private wells
18 along 130 that are meeting
19 drinking water standards that are
20 closer to the site than where you
21 are.

22 When you put a well in, they
23 sample it. The person who puts
24 the well in then samples it.

25 MS. COY: After you pay for

1 it.

2 MS. O'CONNELL: I think they
3 have to. When they install a new
4 well, they have to sample it.

5 MS. COY: Right.

6 You have to pay for that
7 well first.

8 MS. O'CONNELL: Right.

9 So, you're saying how do I
10 know it will be clean?

11 Off site won't be impacted.
12 On site --

13 MS. COY: It's across the
14 street. My mailbox is here.

15 MS. HWILKA: Our site is --
16 here's Pennsgrove-Pedricktown
17 Road, then it would be Route 130,
18 and then we have Porcupine Road
19 somewhere up here --

20 MS. COY: You have signs
21 posted up across the street from
22 me, that's all.

23 MS. HWILKA: Right. The
24 signs are probably making you
25 aware that there is a Superfund

1 site in the vicinity.

2 But our actual site is
3 bordered by that east stream,
4 basically, which is west of
5 Porcupine Road. So, it's not --
6 our site doesn't extend all the
7 way out, if I'm understanding
8 where Railroad Avenue is. I think
9 that's several --

10 MS. COY: I'm right on the
11 corner of Railroad Avenue and 130.

12 MS. HWILKA: Right.

13 Our contamination is only
14 around this area, even closer than
15 Porcupine Road. Here's the east
16 stream and Benjamin Green Road,
17 and our contamination is in this
18 area and the groundwater flows
19 west.

20 So, it sounds like you're
21 east of the site and several -- a
22 few blocks, quite some area away.

23 MS. COY: Not that far.

24 MS. HWILKA: Right.

25 But our groundwater -- what

1 I'm saying is our clean zone has
2 been established to not have
3 reached Porcupine Road or Railroad
4 Avenue and our flow is in the
5 opposite direction.

6 And we've seen decreasing
7 concentrations over time, so our
8 contamination, site-related
9 contamination, is located just in
10 this general vicinity.

11 So, we haven't tested your
12 well, obviously, but in terms of
13 site-related, I'd be hard-pressed
14 to think that NL would have had
15 site contamination east of this
16 area.

17 MS. COY: There's also
18 contamination from another company
19 here.

20 MS. HWILKA: Well, I'm not
21 aware of that. This is just for
22 NL Industries.

23 MS. LONEY: Are there any
24 further questions?

25 MR. BRADFORD: I have one.

1 George Bradford. Follow-up on
2 what Bill was asking.

3 What are we talking about, a
4 ten-year program?

5 Is that what this will
6 revolve around?

7 MS. HWILKA: It's going to
8 take a little bit of time to do
9 the treatability study, and then
10 once we have the design --

11 MR. BRADFORD: Are you
12 including that in the ten years?

13 MS. HWILKA: No.

14 The ten years is once we
15 have established --

16 MR. BRADFORD: So, you do
17 the treatability study, and then
18 you're saying another ten years
19 probably?

20 MS. HWILKA: Right.

21 But, again, once we have our
22 design and everything has been
23 implemented, you can still
24 reuse -- I know that's a concern
25 of the town -- you can reuse a

1 portion of the property because if
2 we go with reagent injection, it's
3 not as invasive as the pump and
4 treatment, we're not building a
5 big plant. There will be a series
6 of injection wells that we would
7 just need to have access to to
8 sample.

9 So, it would depend on the
10 site use.

11 MR. BRADFORD: At what point
12 would we be able to use the land
13 again?

14 MS. O'CONNELL: Well, we
15 don't own the property. The
16 property is abandoned, as we
17 understand it.

18 We support the appropriate
19 use of Superfund sites, you know,
20 as appropriate. So, we're going
21 to be doing some work at this
22 site, but there's a lot of areas
23 of the site where we're not going
24 to do work.

25 We've spoken to the town

1 before. The town has been
2 interested in the potential of
3 redeveloping the site or using it
4 for some purpose. So, we will
5 tell you that that's not out of
6 the question, although we will
7 need to access the site.

8 But we will not be building
9 a giant plant that's going to be
10 taking up this whole site. That's
11 not what we anticipate.

12 So, if the town is
13 interested in redeveloping the
14 site or has a developer or
15 somebody, I don't even know who
16 owns the site. I don't think the
17 town owns it. I think it's been
18 abandoned.

19 MR. BRADFORD: We hold the
20 taxes on it.

21 MS. O'CONNELL: Right, a tax
22 lien.

23 So, in order for somebody to
24 take title to a Superfund site,
25 you know, they would want to do it

1 in a way where they don't have any
2 liability.

3 MR. BRADFORD: Exactly.

4 MS. O'CONNELL: So, there
5 are ways to do that, but you would
6 need to contact our attorneys and
7 the town attorney. And our
8 attorney could discuss that.
9 There are ways to do that because
10 we, in general, support use of
11 these sites if there's a
12 compatible use with what we're
13 doing.

14 So, you would need to tell
15 us what you want to do, we would
16 have to have the attorneys speak
17 so that they can discuss how you
18 would take title if the town wants
19 to take title of the property, how
20 they would do it without gaining
21 any liability.

22 There's a lot of laws and
23 rules, but there's ways to do it.
24 But prior to doing it, we would
25 advise you to discuss it.

1 MR. MILLER: We need to have
2 that meeting.

3 MR. BRADFORD: That's right.

4 MS. O'CONNELL: That's fine.
5 Contact Theresa.

6 MS. HWILKA: What we need,
7 though, is your attorneys to talk
8 to our attorneys.

9 MR. MILLER: Yes, yes.

10 MS. HWILKA: And then once
11 we get to -- the next step would
12 be if we go with this ROD
13 amendment and that gets finalized,
14 then we go into remedial design.

15 That is a good time if you
16 already know or have someone
17 interested in a particular use, if
18 we get specific design documents,
19 not just like I want to use this
20 area but like what are you using
21 it for, what's the footprint, is
22 it just a cement slab structure,
23 you know, things like that so that
24 when we are doing our design, if
25 we can accommodate, you know, a

1 structure by moving an injection
2 well over, we would try to do
3 that.

4 But, again, the remedy comes
5 first, so, we need to put the
6 wells where they need to go. But
7 if you're in the process early on,
8 we can try to look at the designs
9 and work together to try to
10 accommodate the reuse.

11 We don't have to necessarily
12 wait until we meet cleanup
13 standards because there's going to
14 be a restriction that they can't
15 use the groundwater on the site,
16 obviously, but the physical, you
17 know, land surface can be
18 utilized.

19 Sir?

20 MR. KENNEDY: Zeke Kennedy.

21 My property is adjacent. My
22 problem is my whole yard is full
23 of flags.

24 MS. HWILKA: Flats?

25 MR. KENNEDY: Flags.

1 They come and dig the soil
2 out of the ground, and this
3 happens every two years.

4 Now, you're telling me that
5 this is going to happen for the
6 next ten years?

7 MS. HWILKA: No.

8 The groundwater wells are
9 more in the vicinity of the former
10 facility area. But we already
11 have a well network that extends
12 more around this area. And if we
13 need more injection wells, it
14 would be a well that --

15 MR. KENNEDY: I'm not
16 talking about wells, I'm talking
17 about flags.

18 MS. O'CONNELL: Oh, flags.

19 MR. KENNEDY: Is this going
20 to happen for the next ten years?

21 MS. HWILKA: Well, no.

22 What happened was we were
23 doing monitoring and we found some
24 additional pockets of lead, and,
25 so, we re-sampled the whole length

1 of the west stream.

2 And that's the activity
3 that -- the areas where we found
4 lead are going to be excavated
5 this summer, and then we'll do our
6 confirmatory sampling. And once
7 that meets our standards, we'll be
8 monitoring occasionally but not to
9 the extent of all the recent
10 sampling that you've seen.

11 MR. KENNEDY: They come out
12 a couple years ago, they sent me a
13 piece of paper saying my property
14 is clean. Now they're back again.

15 MS. HWILKA: Well, I'll have
16 to look at where your property is
17 located exactly. And, you know,
18 it's in our comments, so I can
19 look on to that comment and look
20 specifically --

21 MR. KENNEDY: My concern is
22 for ten years, am I going to have
23 these flags for ten years?

24 MS. HWILKA: No.

25 That's our goal here. We

1 did a more extensive sampling and
2 tighter grid to make sure that
3 we're not missing areas of
4 contamination because that's a --
5 with the sediment, you're in the
6 stream/wetland area, so sediment
7 doesn't stay in one place, it
8 shifts around a little bit. So,
9 we closed our grids and that's why
10 we did this extensive sampling, so
11 we could be sure we've got it all
12 this time around.

13 So, once it's excavated and
14 we monitor it, subsequent to that,
15 I mean, it shouldn't be a ten-year
16 thing, it should be --

17 MR. KENNEDY: Well, actually
18 they included my well in 1980 or
19 whatever it was, probably 1980s.
20 I don't know when it was. Put an
21 alarm supposedly, I don't know.

22 MS. HWILKA: And we were
23 looking at the sediment at the
24 time adjacent to the stream. But,
25 you know, it's not going to be

1 every year for ten years.

2 MS. O'CONNELL: We will be
3 doing some additional sediment
4 excavation this summer, maybe into
5 the fall. We expect that that
6 will address any remaining
7 sediment contamination. All the
8 flags will be removed and all the
9 area that we excavate will be
10 restored.

11 MR. KENNEDY: And that's it?

12 MS. O'CONNELL: That's the
13 plan.

14 MR. DANSOME: Earl Dansome
15 again.

16 Will the design be done by
17 the EPA or a third party?

18 MS. HWILKA: The responsible
19 party will draw up the work plan;
20 however, we review extensively and
21 have our hydrogeologists, we have
22 risk assessment, everybody at EPA,
23 our whole group will look at the
24 plan. We comment. So, if we
25 don't agree with something, we

1 make a comment. We approve it,
2 basically.

3 So, they write it. Once we
4 determine they've addressed all
5 our comments and we're comfortable
6 with the plan, we can approve it.
7 And, also, the State reviews it as
8 well.

9 So, it's not like they just
10 get to decide what they want to
11 do. EPA, that's what our
12 oversight is for.

13 MR. DANSOME: Once the ROD
14 is done, they'd be locked into the
15 agreement stating they're
16 responsible for it.

17 Correct?

18 MS. HWILKA: Correct. Once
19 we select the remedy, that's what
20 they have to do.

21 MR. DANSOME: They have the
22 responsibility to select the
23 consultant or contractor or
24 whoever to do the work?

25 MS. HWILKA: Correct.

1 But, again, whatever
2 contractors they choose, that work
3 product gets reviewed by us and
4 nothing gets implemented until we
5 approve it.

6 MR. DANSOME: Okay.

7 MR. KENNEDY: This stuff you
8 inject, you inject it right into
9 the wells?

10 MS. HWILKA: We inject into
11 the groundwater well network.

12 MS. O'CONNELL: It's under
13 in the vicinity of the dump, right
14 where it's contaminated.

15 MS. HWILKA: We don't pierce
16 the cap. The landfill is
17 addressed. That's covered and
18 capped. We don't deal with that.

19 All our wells are, you know,
20 around here, so we would inject
21 into the wells.

22 MR. KENNEDY: That's the
23 lining?

24 MS. HWILKA: Yes, the whole
25 landfill is capped, it's

1 contained.

2 MR. KENNEDY: They put that
3 rubber lining on top of that
4 already?

5 MS. HWILKA: Right, they
6 maintain it. They have to -- I
7 know there was a point where we
8 regraded it and restructured it
9 because the grade wasn't -- that's
10 been taken care.

11 MS. DOLBOW: Jaime Dolbow.

12 I guess my only concern
13 right now is when the gentleman
14 asked about whether another
15 Superfund site used what you're
16 recommending, I don't feel like
17 you gave us a strong oh, we know
18 it works, blah, blah, blah.

19 Who else -- are we entitled
20 to know who else has ever used
21 this process?

22 MS. HWILKA: We know it
23 works, I just don't know the sites
24 offhand. But in my responsiveness
25 summary, I can come up with a list

1 of areas where it has been used.

2 In our Feasibility Study, we
3 provided all the studies that have
4 shown where reagent injection has
5 worked and has been successful.
6 We don't just use remedies -- it
7 has to be proven. We don't just
8 use it to try it out.

9 MS. O'CONNELL: We have
10 selected a reagent injection
11 remedy at the Puchack Well site.
12 We've done a treatability study
13 there. It's a different type of
14 site, with chromium contamination
15 in groundwater, hexavalent
16 chromium.

17 We're injecting lactate into
18 it, and we've done treatability
19 studies which went very well,
20 we're very confident, and we're
21 going to be starting the
22 injections later this year.

23 And there are some other
24 sites. We can get you information
25 on other sites where it's been

1 used. Even though it's proven
2 technology and we have collected
3 extensive data on the hydrology
4 conditions here and we believe
5 it's going to work, we have high
6 level of confidence it will work,
7 we will be doing a treatability
8 study in a small area to confirm
9 that and to collect data to give
10 us -- so we can design the details
11 of how we're going to do it.

12 Sometimes injection points
13 need to be ten feet or twenty feet
14 apart. It depends on the
15 condition of the site. So, we
16 will be doing some additional
17 onsite work on a small scale which
18 will not only -- we expect it to
19 confirm it's going to work, and it
20 will also help us design the
21 details on how to make it work in
22 this particular site in this
23 specific geology.

24 MS. LONEY: Are there any
25 further questions?

1 UNKNOWN SPEAKER: How soon
2 is this remedy going to begin?

3 MS. O'CONNELL: We expect to
4 select a remedy approximately in
5 September, within a couple of
6 months. We have to close the
7 public comment period and make
8 sure we're fully considering all
9 public comments, and we'll select
10 a remedy later this year. And
11 then we need to work with the
12 responsible parties and come up
13 with the design or plan, do a
14 treatability study.

15 That's likely to take a
16 couple of years by the time that's
17 done. That's just how it works.
18 Groundwater remedies are very
19 complex, and the details -- the
20 description of remedy is not
21 complex, but the details are on
22 how it will get implemented
23 effectively.

24 The engineering design
25 generally takes, once it's

1 started, anywhere between one and
2 a half and two a and half years.
3 In this particular case, the
4 treatability study will be a big
5 part of it. That will take some
6 time. It's necessary in order for
7 us to ensure that the full
8 implementation of the remedy is
9 going to be done effectively.

10 So, it's going to be a few
11 years before we go to full-scale
12 implementation of the remedy.

13 MS. COY: Are you saying
14 it's going to be three to five
15 years, then?

16 That's what it sounds like.

17 MS. O'CONNELL: I think
18 maybe a little less than that.
19 Again, we'll have to keep you guys
20 updated as we go along, but I
21 think it would be less than that.

22 I mean, you still have to
23 develop the plans for the
24 treatability study and the work
25 plan.

1 MS. COY: Sounds like three
2 to five years, then.

3 MS. O'CONNELL: I don't
4 think it will take three to five
5 years. I mean, if we start later
6 this year, the treatability study
7 would likely start next year. How
8 long that's going to take, I'm not
9 really sure. We're going to have
10 experts from, you know, ORD and
11 we'll have a lot of people look at
12 it to make sure it's accurate.

13 It's going to be a detailed
14 work plan and a detailed
15 treatability study, and the
16 results have to be analyzed
17 carefully so that an engineering
18 design can be done.

19 And an engineering design
20 has several phases. You know,
21 there's a preliminary design, then
22 we review it, then we go to an
23 intermediate and a final design
24 until it's approved. So, it's not
25 a short-term process.

1 Groundwater, when you get
2 into the details, it's complex.
3 There's a lot of details that will
4 be dealt with.

5 MS. HWILKA: And in all this
6 interim, we'll be doing
7 monitoring. It's not like we'll
8 just stop while we're doing this
9 design.

10 MS. O'CONNELL: I would hope
11 that we'd be able to implement the
12 remedy closer to three years than
13 five years, but we will have to
14 keep the community informed as to
15 the schedule as we go forward.

16 UNKNOWN SPEAKER: There was
17 a special on the New Jersey
18 channel about a week and a half
19 ago, and it was on this. And I
20 could have swore I heard --
21 because I was shocked. I didn't
22 really know about this until the
23 special came on the New Jersey
24 station about a week and a half
25 ago, and I called my husband at

1 work and said: You need to hear
2 this.

3 I thought I heard them say
4 they were having problems getting
5 National Lead to put -- it didn't
6 sound good.

7 MR. SKORKA: They were
8 talking about a different site for
9 them, in Sayreville.

10 UNKNOWN SPEAKER: They were
11 talking about a couple sites.

12 MS. HWILKA: Right, but not
13 this site.

14 MR. SKORKA: That was the
15 Raritan River and sites along
16 there.

17 MS. HWILKA: There's another
18 NL site, in other words.

19 MR. SKORKA: There were
20 several sites.

21 UNKNOWN SPEAKER: It's
22 National Lead.

23 MS. HWILKA: Yes, it is
24 National Lead, but it's a
25 different site. It's the same

1 company.

2 But wherever they had
3 facilities, there was
4 contamination, just as we have one
5 facility here. This is one site.
6 NL had lead on another site, and
7 that's the one referred to in the
8 special.

9 MR. BERCUTE: I think you've
10 got my name, Tom Bercute.

11 Who is it ultimately up to?

12 Who can decide on when we
13 can use this land?

14 Is it up to the EPA
15 attorney?

16 MS. HWILKA: What it's up to
17 first is you have to own the
18 property. EPA doesn't own it.

19 MR. BERCUTE: I mean, I've
20 been talking about this property
21 for years now.

22 MS. HWILKA: You need to
23 talk to --

24 MR. BERCUTE: And I've
25 talked to Demaris.

1 MS. HWILKA: Demaris, yes.

2 MR. BERCUTE: Is he still
3 with the EPA?

4 MS. HWILKA: She's the EPA
5 attorney.

6 But as Kim stated, what
7 needs to happen, as the mayor has
8 stated, the town's attorney needs
9 to speak with EPA's attorney I
10 guess to determine what to do with
11 the property in terms of
12 ownership --

13 MR. BERCUTE: I mean, I
14 could have used this years ago and
15 generated money for this town and
16 possibly created jobs for the
17 local residents.

18 MS. HWILKA: But we don't
19 own the site, so the ownership
20 portion needs to be worked out
21 between yourself and the town, and
22 the town will work with us in
23 terms of the liability issues.

24 But once we know who owns it
25 and what you want to use it for,

1 again, specifically design, not
2 just I want to use this area for
3 storage, but a physical design --

4 MR. BERCUTE: I think I've
5 actually e-mailed you.

6 MS. HWILKA: Yes, you
7 e-mailed me about a general area
8 for storage.

9 But, again, we don't own the
10 property right now, so it needs to
11 be worked out with the town, the
12 ownership.

13 MR. BERCUTE: I talk to Mr.
14 Miller and then the Pedricktown
15 attorney talks to the EPA
16 attorney.

17 Is that how it works?

18 MS. HWILKA: It has to be --
19 yes, the town's attorney and our
20 attorney need to talk because they
21 need to figure out who will own
22 the property because it's
23 abandoned. Again, we don't own
24 it, so we can't say --

25 MR. BERCUTE: Right.

1 I want to help generate
2 money for the town, not have it a
3 liability. If we can use it now,
4 you know, for our purposes, then
5 that would help the whole town.

6 MS. HWILKA: Again, once
7 it's worked out with the town and
8 they know they own it or what have
9 you --

10 MS. O'CONNELL: You want to
11 take ownership without liability.

12 MR. BRADFORD: The
13 liability, that's always been the
14 problem.

15 MS. O'CONNELL: There are
16 ways to do that, but they involve
17 legal determinations. So, that's
18 where the attorneys need to get
19 involved.

20 There are laws that will
21 protect people if they do certain
22 things or follow certain
23 conditions, and that's what needs
24 to be -- you need to understand
25 and our attorneys will explain

1 that to you. And then --

2 MR. BERCUTE: We're actually
3 very familiar with doing things
4 like that. We worked with Dadorac
5 in Delaware, the state government
6 in South Carolina, DHEC, and we've
7 worked with EPA people too. So,
8 we're familiar with that.

9 We actually have monitoring
10 wells on our site right now and
11 we're familiar with access,
12 letting people in to do their
13 testing, and we work -- you know,
14 we work with the EPA, DEP.

15 MS. O'CONNELL: We're not
16 concerned with respect to anybody
17 being on site and being exposed to
18 the soil. That's all meeting
19 cleanup standards.

20 Our concern would be that we
21 need certain access and we need
22 whoever owns the property to give
23 us access and we need a certain
24 area to implement our remedy.

25 Other than that, as long as

1 what's being done is not
2 incompatible with our remedy and
3 not where we want to implement the
4 remedy physically, we won't have
5 concerns about some storage
6 facility or some appropriate use
7 of that site.

8 But we need to work
9 together.

10 MR. BERCUTE: Exactly.
11 That's what I want to do. That's
12 what I've been trying to do for
13 years, as far as I've been open
14 to, you know, where you would have
15 the access. We wouldn't do any
16 digging, you know.

17 I've been open to any ideas,
18 and it's really just kind of been
19 blocked. I don't know if this has
20 to be approved first before we can
21 move forward.

22 MS. O'CONNELL: Well, it
23 helps when we know exactly what we
24 want to do once we select the
25 detailed remedy and we have

1 conceptual -- not every detail,
2 but we have a conceptual idea of
3 what we want to do and what space
4 we would need, what access we
5 would need.

6 MR. BERCUTE: And I want to
7 work with you guys. I know you
8 guys weren't the ones who polluted
9 the land.

10 MS. O'CONNELL: Somebody
11 wants to develop it, somebody has
12 to own it. Nobody owns it.
13 That's the --

14 MR. BERCUTE: Should I just
15 go there and stand there until
16 somebody talks to me?

17 MS. O'CONNELL: Possession
18 is nine-tenths of the law.

19 (Laughter)

20 MS. HWILKA: It almost
21 sounds like we need to have our
22 attorneys talk with the town, and
23 then --

24 MR. BERCUTE: Yeah, I think
25 I'll have to meet with Mr. Miller.

1 MS. HWILKA: And subsequent
2 to that, perhaps you guys would
3 want to meet to see what you can
4 work out in terms of ownership.

5 And at that point, you know,
6 if the town decides okay, we're
7 selling this property and your
8 company or whoever happened to
9 purchase it has their design,
10 that's where, you know, we then
11 would work with -- you know, you
12 can work with EPA to facilitate
13 your construction without
14 hindering our remedy.

15 MR. BERCUTE: Exactly.

16 Again, we're familiar with
17 that, we've done it, we've
18 completed projects like that. So,
19 that wouldn't be a problem as far
20 as, you know, us being there.

21 MS. HWILKA: We'll follow up
22 on that with the attorneys.

23 MS. LONEY: If there are no
24 further questions, we're going to
25 close the public meeting.

1 Again, the comment period is
2 closing on the 21st of July. So,
3 if you haven't submitted -- if
4 you'd like to submit your
5 comments, you can send it to
6 Theresa. That's her e-mail
7 address. It's also on the back of
8 the proposed plan. You can e-mail
9 it to her or send it via snail
10 mail.

11 In addition, the proposed
12 plan is on that web page. I think
13 maybe we'll post --

14 You want to post the
15 presentation as well?

16 MS. HWILKA: Sure.

17 MS. LONEY: We'll also post
18 tonight's presentation and you can
19 access it on that site if there's
20 anything you want to review
21 further before you submit your
22 comments.

23 If you have not done so, I
24 ask that you sign in because one
25 of the things that happens during

1 the transcribing of the
2 stenographer's notes is if she
3 didn't necessarily get a name, she
4 can check it off of the sign-in
5 sheet. So, take an opportunity to
6 sign in as you're leaving.

7 And I thank you all for
8 coming. July 28 is the -- I don't
9 want to say drop dead date, but
10 it's the closing date.

11 So, thank you all.

12 (Time noted: 8:12 p.m.)
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C E R T I F I C A T E

STATE OF NEW YORK)

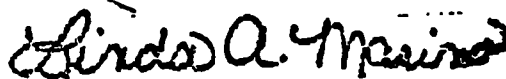
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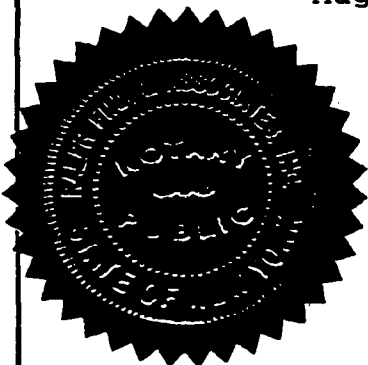
COUNTY OF NEW YORK)

I, LINDA A. MARINO, RPR,
CCR, a Shorthand (Stenotype)
Reporter and Notary Public of the
State of New York, do hereby certify
that the foregoing transcription of
the public meeting held at the time
and place aforesaid is a true and
correct transcription of my
shorthand notes.

I further certify that I am
neither counsel for nor related to
any party to said action, nor in any
way interested in the result or
outcome thereof.

IN WITNESS WHEREOF, I have
hereunto set my hand this 2nd day of
August, 2011.



LINDA A. MARINO, RPR, CCR

APPENDIX IV – ADMINISTRATIVE RECORD INDEX

125/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 1

Document Number: NLI-001-0001 To 0010

Date: / /

Title: Potential Hazardous Waste Site Site Inspection Report - NL Industries Inc.

Type: PLAN

Author: Zarvas, David: NJ Department of Environmental Protection (NJDEP)

Recipient: none: none

Doc ID# 54366

Document Number: NLI-001-0011 To 0108

Date: 05/01/83

Title: Hydrogeologic Study and Design of Ground Water Abatement System at NL Industries Inc., Pedricktown
NJ Plant Site

Type: PLAN

Author: none: Garaghty & Miller

Recipient: none: none

Doc ID# 54367

Document Number: NLI-001-0109 To 0279

Date: 05/01/87

Title: Work Plan - Remedial Investigation/Feesibility Study - National Smelting of NJ Site, Pedricktown
NJ

Type: PLAN

Condition: INCOMPLETE; MARGINALIA

Author: none: O'Brien & Gere

Recipient: none: NL Industries, Inc.

Doc ID# 54368

Document Number: NLI-001-0280 To 0428

Date: 05/01/87

Title: Work Plan - Remedial Investigation/Feesibility Study - National Smelting of NJ Site, Pedricktown
NJ

Type: PLAN

Author: none: O'Brien & Gere

Recipient: none: NL Industries, Inc.

Doc ID# 54369

/25/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 2

Document Number: NLI-001-0027 To 0509

Date: 08/01/87

Title: DBG Laboratories, Inc. QA Program Manual - Remedial Investigation/Feasibility Study - National Smelting of NJ Site, Pedricktown NJ

Type: PLAN

Author: none: O'Brien A Oare

Recipient: none: NL Industries, Inc.

Doc ID# 54370

Document Number: NLI-001-0510 To 0537

Parent: NLI-001-0512

Date: 04/01/88

Title: Field Sampling and Analysis Plan - RI/FS Oversight - NL Industries Site, Pedricktown NJ

Type: PLAN

Author: Norzempa, Lewis M: Ebasco Services

Recipient: none: US EPA

Doc ID# 54371

Document Number: NLI-001-0512 To 0513

Date: 03/03/88

Title: (Letter submitting Field Sampling and Analysis Plan)

Type: CORRESPONDENCE

Author: Sachdev, Dev R.: Ebasco Services

Recipient: Alvi, N. Shaheer: US EPA

Attached: NLI-001-0510

Doc ID# 54372

Document Number: NLI-001-0538 To 0539

Parent: NLI-001-0539

Date: 05/01/88

Title: Site Operations Plan - Remedial Investigation Plan/Feasibility Study - National Smelting of NJ Site, Pedricktown NJ

Type: PLAN

Author: none: O'Brien A Oare

Recipient: none: NL Industries, Inc.

Doc ID# 54373

Document Number: NLI-001-0539 To 0540

Date: 05/10/88

Title: (Letter submitting the Final Site Operations Plan)

Type: CORRESPONDENCE

Condition: MARGINALIA

Author: Nolt, Stephen W.: NL Industries, Inc.

Recipient: Donato, Marwin: US EPA

Attached: NLI-001-0538

Doc ID# 54374

./25/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 3

Document Number: NLI-001-0890 To 1265

Date: 06/01/90

Title: Technical Memorandum - Data Validation - National Spitting of NJ Site, Pedricktown NJ

Type: PLAN

Condition: MARGINALIA

Author: none: D'Brien & Gere

Recipient: none: NL Industries, Inc.

Doc ID# 54375

Document Number: NLI-001-1266 To 1280

Date: 12/01/90

Title: NL Industries Sediment Analyses - Phase III

Type: DATA

Author: none: none

Recipient: none: none

Doc ID# 54376

Document Number: NLI-001-1281 To 1282

Date: 11/01/90

Title: NL Industries Soil Analyses - Phase III

Type: DATA

Author: none: none

Recipient: none: none

Doc ID# 54377

Document Number: NLI-001-1285 To 1297

Date: 12/01/90

Title: NL Industries Groundwater Analyses - Phase III

Type: DATA

Author: none: none

Recipient: none: none

Doc ID# 54378

Document Number: NLI-001-1298 To 1304

Date: 12/01/90

Title: NL Industries Surface Water Analyses - Phase III

Type: DATA

Author: none: none

Recipient: none: none

Doc ID# 54379

12/25/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 4

Document Number: NL1-001-1308 To 1312

Date: 12/01/90

Title: NL Industries Sediment Analyses - Phase III

Type: DATA

Author: none: none

Recipient: none: none

Doc ID# 54380

Document Number: NL1-001-1313 To 1322

Date: 08/01/89

Title: NL Industries Oversight Groundwater Analyses - Phase II

Type: DATA

Author: none: none

Recipient: none: none

Doc ID# 54381

Document Number: NL1-001-1323 To 1347

Date: 10/01/88

Title: (Phase I Water and Soil Analyses, Site No. 1)

Type: DATA

Author: none: none

Recipient: none: none

Doc ID# 54382

Document Number: NL1-001-1348 To 1398

Date: 06/01/90

Title: Final RI Oversight Summary Report - NL Industries Site, Pedricktown NJ

Type: REPORT

Condition: MARGINALIA

Author: Rubin, David B: Ebasco Services

Recipient: none: US EPA

Doc ID# 54383

Document Number: NL1-001-1394 To 1673

Date: 10/01/90

Title: Remedial Investigation - National Smelting of NJ/NL Industries Site Volume I: Report, Tables, Figures

Type: REPORT

Author: none: O'Brien & Gere

Recipient: none: NL Industries, Inc.

Doc ID# 54384

1/25/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 5

Document Number: NLI-001-1874 To 2187

Date: 10/01/90

Title: Remedial Investigation - National Smelting of NJ/NL Industries Site Volume II: Appendices, Exhibits

Type: REPORT

Author: none: O'Brien & Gere

Recipient: none: NL Industries, Inc.

Doc ID# 54385

Document Number: NLI-001-2188 To 2319

Date: 12/01/90

Title: Remedial Investigation - National Smelting of NJ/NL Industries Site Volume III: Appendices R-U

Type: REPORT

Author: none: O'Brien & Gere

Recipient: none: NL Industries, Inc.

Doc ID# 54386

Document Number: NLI-001-2320 To 2342

Date: 04/14/90

Title: (Letter forwarding the revised RI Oversight Summary Report)

Type: CORRESPONDENCE

Author: Rubin, David B: Ebasco Services

Recipient: Gilbert, Michael W: US EPA

Attached: NLI-001-2323

Doc ID# 54387

Document Number: NLI-001-2323 To 2342

Parent: NLI-001-2320

Date: 04/01/90

Title: Final RI Oversight Summary Report - NL Industries Site, Pedricktown NJ

Type: REPORT

Author: Rubin, David B: Ebasco Services

Recipient: none: US EPA

Doc ID# 110834

Document Number: NLI-001-2343 To 2354

Date: 07/19/90

Title: (Letter forwarding attached summary comparison of USEPA and NL Industries data for the Phase II split samples)

Type: CORRESPONDENCE

Author: Rubin, David B: Ebasco Services

Recipient: Gilbert, Michael W: US EPA

Doc ID# 54388

7/28/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 6

Document Number: NLI-001-2355 To 2358

Date: 09/19/90

Title: (Letter indicating need for additional sampling at the site)

Type: CORRESPONDENCE

Condition: MARGINALIA

Author: Basso, Raymond: US EPA

Recipient: Nolt, Stephen W: NL Industries, Inc.

Doc ID# 54389

Document Number: NLI-001-2359 To 2361

Date: 10/05/90

Title: (Letter requesting retesting of soils and rejecting request for extension for submittal of RI Report)

Type: CORRESPONDENCE

Author: Basso, Raymond: US EPA

Recipient: Nolt, Stephen W: NL Industries, Inc.

Doc ID# 54390

Document Number: NLI-001-2362 To 2365

Date: 11/15/90

Title: (Letter conveying approval of the amended Sampling Plan and outlining methods for sample collecting and analysis)

Type: CORRESPONDENCE

Author: Basso, Raymond: US EPA

Recipient: Nolt, Stephen W: NL Industries, Inc.

Doc ID# 54391

Document Number: NLI-001-2366 To 2367

Date: 11/26/90

Title: (Letter outlining analysis guidelines)

Type: CORRESPONDENCE

Author: Gilbert, Michael W: US EPA

Recipient: Nolt, Stephen W: NL Industries, Inc.

Doc ID# 54392

125/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 7

Document Number: NLI-001-2368 To 2570

Date: 11/29/90

Title: (Letter stating EPA's intention to take and analyze samples from the site)

Type: CORRESPONDENCE

Author: Sasse, Raymond: US EPA

Recipient: Molt, Stephen W: NL Industries, Inc.

Doc ID# 54393

Document Number: NLI-001-2371 To 2373

Date: 03/06/91

Title: (Letter requesting changes in the 10/90 Remedial Investigation Report)

Type: CORRESPONDENCE

Author: Sasse, Raymond: US EPA

Recipient: Molt, Stephen W: NL Industries, Inc.

Doc ID# 54394

Document Number: NLI-001-2374 To 2385

Date: 04/23/91

Title: (Letter forwarding attached information pertaining to wells at the site)

Type: CORRESPONDENCE

Author: Molt, Stephen W: NL Industries, Inc.

Recipient: Kethari, Dilip: Ebasco Services

Doc ID# 54395

Document Number: NLI-001-2386 To 2390

Date: 04/10/89

Title: Preliminary Health Assessment for NL Industries

Type: PLAN

Author: none: Agency for Toxic Substances & Disease Registry (ATSDR)

Recipient: none: none

Doc ID# 54396

Document Number: NLI-001-2391 To 2391

Date: 02/28/91

Title: (Letter stating that NL Industries will have to close the underground storage tanks at the site)

Type: CORRESPONDENCE

Condition: MISSING ATTACHMENT

Author: Melstrea, Christina: NJ Department of Environmental Protection (NJDEP)

Recipient: Gilbert, Michael H: US EPA

Doc ID# 54397

1/25/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 8

Document Number: NLI-001-2392 To 2392

Date: / /

Title: (List of EPA Guidance Publications)

Type:

Author: none: none

Recipient: none: none

Doc ID# 54398

Document Number: NLI-001-2399 To 2393

Date: 08/20/90

Title: (Letter requesting applicable or relevant requirements which pertain to the site)

Type: CORRESPONDENCE

Author: Gilbert, Michael M.: US EPA

Recipient: Melstrom, Christine: NJ Department of Environmental Protection (NJDEP)

Doc ID# 54399

Document Number: NLI-001-2394 To 2394

Date: 10/15/90

Title: (Letter regarding applicable or relevant requirements for testing at the site)

Type: CORRESPONDENCE

Author: Melstrom, Christine: NJ Department of Environmental Protection (NJDEP)

Recipient: Gilbert, Michael M.: US EPA

Attached: NLI-001-2409

Doc ID# 54400

Document Number: NLI-001-2395 To 2408

Date: 11/27/90

Title: (Referral for forwarding attached surface water ARARs for the site)

Type: CORRESPONDENCE

Author: Melstrom, Christine: NJ Department of Environmental Protection (NJDEP)

Recipient: Gilbert, Michael M.: US EPA

Doc ID# 54401

Document Number: NLI-001-2409 To 2412

Parent: NLI-001-2394

Date: 03/01/88

Title: Regulations Implementing the New Jersey Water Pollution Control Act

Type: LEGAL DOCUMENT

Author: none: NJ Department of Environmental Protection (NJDEP)

Recipient: none: none

Doc ID# 54402

3/23/96

Index Document Number Order
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Page: 9

Document Number: NLI-002-0001 To 0119

Date: 09/01/90

Title: Regulations Implementing the New Jersey Underground Storage of Hazardous Substances Act

Type: LEGAL DOCUMENT

Author: none: NJ Department of Environmental Protection (NJDEP)

Recipient: none: none

Doc ID# 54403

Document Number: NLI-002-0120 To 0182

Date: / /

Title: NJDEP Fresh Water Permit Application

Type: OTHER

Author: none: none

Recipient: none: none

Doc ID# 54404

Document Number: NLI-002-0163 To 0185

Date: 12/01/86

Title: Final Community Relations Plan - NL Industries Site, Pedricktown, NJ

Type: PLAN

Author: Diamond, Christopher R.: ICF Incorporated

Recipient: none: US EPA

Doc ID# 54405

Document Number: NLI-002-0186 To 0208

Parent: NLI-002-0188

Date: 01/01/89

Title: Final Public Information Meeting Summary for the NL Industries Site, Redricktown, NJ

Type: PLAN

Author: Manning, Kathleen S.: ICF Incorporated

Recipient: none: US EPA

Doc ID# 54406

Document Number: NLI-002-0188 To 0189

Date: 01/23/89

Title: (Letter submitting the Final Public Information Meeting Summary)

Type: CORRESPONDENCE

Author: Sachdev, Dev R.: Ebasco Services

Recipient: Johnson, Lillian: US EPA

Attached: NLI-002-0186

Doc ID# 54407

3/25/96

Index Document Number Order
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Page: 10

Document Number: NLI-002-0209 To 0219

Date: 01/01/91

Title: Oversight Summary Report - NL Industries Site, Pedricktown NJ

Type: REPORT

Author: none: Ebesca Services

Recipient: none: US EPA

Doc ID# 54408

Document Number: NLI-002-0220 To 0261

Date: 01/01/92

Title: A Stage 1A Cultural Resources Survey of the MSNJ/NL Property, Oldmans Township, Salem County
NJ

Type: Plan

Author: Crist, Thomas A.J.: John Milner Associates

McCarthy, John P.: John Milner Associates

Recipient: none: O'Brien & Gere

none: NL Industries, Inc.

Doc ID# 54409

Document Number: NLI-002-0262 To 0363

Date: 03/01/91

Title: Volume IV, Appendices V-W, Remedial Investigation National Sealing of New Jersey, Inc./NL
Industries, Inc. Site, Pedricktown, New Jersey

Type: PLAN

Author: none: O'Brien & Gere

Recipient: none: none

Doc ID# 54410

Document Number: NLI-002-0364 To 0367

Parent: NLI-002-2078

Date: 07/08/91

Title: (Letter approving the Remedial Investigation (RI) Report, Volumes I-IV for the NL Industries,
Inc., site, in conjunction with EPA's enclosed RI Addendum, and approving the Feasibility Study
Workplan with modifications specified in the letter.)

Type: CORRESPONDENCE

Author: Basso, Raymond: US EPA

Recipient: Helt, Stephen W.: NL Industries, Inc.

Doc ID# 54411

128/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 11

Document Number: NLI-002-0368 To 0375

Parent: NLI-002-2078

Date: / /

Title: Addendum to the Remedial Investigation, Volumes I-IV, NL Industries, Inc., Superfund Site,
Pedricktown, New Jersey

Type: PLAN

Author: none: US EPA

Recipient: none: none

Doc ID# 54412

Document Number: NLI-002-0376 To 0428

Date: 07/01/93

Title: Addendum to the Final Feasibility Study Report, NL Industries, Inc. Superfund Site, Operable
Unit One, Pedricktown, New Jersey

Type: PLAN

Author: none: US EPA

Recipient: none: none

Doc ID# 54413

Document Number: NLI-002-0429 To 0521

Date: 02/01/93

Title: Final Report, TCLP Screening, National Lead Industries Site, Pedricktown, NJ

Type: REPORT

Author: Bevitz, Paul: Environmental Response Team (ERT)

Sprenger, Mark O.: Environmental Response Team (ERT)

Recipient: none: none

Doc ID# 54414

Document Number: NLI-002-0522 To 0556

Date: 02/15/93

Title: Stage IB Cultural Resources Survey, National Smelting of New Jersey Property, Oldmans Township,
Salem County, New Jersey

Type: PLAN

Author: Grubb, Richard C.: Richard Grubb & Associates, Inc.

Nansen, James M.: Richard Grubb & Associates, Inc.

Recipient: none: O'Brien & Gere

Doc ID# 54415

5/25/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 12

Document Number: NLI-002-0557 To 0557

Date: 05/12/93

Title: (Letter forwarding the "Final Feasibility Study Report," which addresses EPA's comments on the "Draft Feasibility Study Report for the Pedricktown site.")

Type: CORRESPONDENCE

Author: Caracciolo, Angela J. III: O'Brien & Gere

Recipient: Gilbert, Michael: US EPA

Attached: NLI-002-0558

Doc ID# 54416

Document Number: NLI-002-0558 To 1129

Parent: NLI-002-0557

Date: 05/01/93

Title: Final Feasibility Study, NL Industries, Inc. Site, Pedricktown, New Jersey

Type: REPORT

Author: none: O'Brien & Gere

Recipient: none: US EPA

Doc ID# 54417

Document Number: NLI-002-1150 To 1228

Date: 06/01/93

Title: Final Report, Field Ecological Assessment, National Lead Site, Pedricktown, Salem County, NJ

Type: REPORT

Author: Bevitz, Paul: ERT

Sprenger, Mark D.: ERT

Recipient: none: none

Doc ID# 54418

Document Number: NLI-002-1229 To 1604

Date: 06/01/93

Title: Final Report, Field Ecological Assessment, National Lead Site, Pedricktown, Salem County, NJ - Appendices A to E

Type: REPORT

Author: Henry, Richard: ERT

Sprenger, Mark D.: ERT

Recipient: none: none

Doc ID# 54419

1/25/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 13

Document Number: NLI-002-1605 To 1899

Date: 06/01/93

Title: Pinel Report, Field Ecological Assessment, National Lead Site, Pedricktown, Salem County,
NJ - Appendices F to L

Type: REPORT

Author: Henry, Richard: ERT
Spranger, Mark D.: ERT

Recipient: none: none

Doc ID# 54420

Document Number: NLI-002-1900 To 1965

Date: 06/01/93

Title: Final Report, National Lead Industries, Pedricktown, New Jersey, Ecological Risk Assessment

Type: REPORT

Author: Grossman, Scott: ERT
Kracko, Karan: ERT
Spranger, Mark D.: ERT

Recipient: none: none

Doc ID# 54421

Document Number: NLI-002-1966 To 1972

Date: 06/01/93

Title: Final Report, Recommendations for Ecologically Based Lead Remedial Goals, National Lead Industries,
Pedricktown, New Jersey

Type: REPORT

Author: Spranger, Mark D.: ERT
Recipient: none: none

Doc ID# 54422

Document Number: NLI-002-1973 To 1973

Date: 06/25/93

Title: (Mass containing comments on the May 1993 Pinel Feasibility Study Report for the NL Industries
site)

Type: CORRESPONDENCE

Author: Prendergast, John: New Jersey Department of Environmental Protection and Energy
Recipient: Harvey, Paul: New Jersey Department of Environmental Protection and Energy
Attached: NLI-002-1974

Doc ID# 54423

4/25/94

Index Document Number Order
NL INDUSTRIES, OPERABLES UNIT 1 Documents

Page: 14

Document Number: NLI-002-1974 To 1974

Parent: NLI-002-1973

Date: 05/24/93

Title: (Memo stating that the NL Draft Feasibility Study has satisfactorily addressed Comments 1 and 2, which were mentioned in a February 9, 1993, memo)

Type: CORRESPONDENCE

Condition: MISSING ATTACHMENT

Author: Kaplan, David M.: New Jersey Department of Environmental Protection and Energy
Recipient: none: New Jersey Department of Environmental Protection and Energy

Doc ID# 54424

Document Number: NLI-002-1975 To 1994

Date: 07/01/93

Title: Superfund Proposed Plan, NL Industries, Inc. operable unit One, Pedricktown, Salem County, New Jersey

Type: PLAN

Author: none: US EPA
Recipient: none: none

Doc ID# 54425

Document Number: NLI-002-1995 To 2012

Date: 07/14/93

Title: (Action Memorandum requesting a ceiling increase and a removal action restart at the National Lead Industries Inc., Site, Pedricktown, Salem County, New Jersey)

Type: CORRESPONDENCE

Author: Gomineck, Eugene: US EPA
Recipient: Muszynski, William J.: US EPA

Doc ID# 54426

Document Number: NLI-002-2013 To 2013

Date: 07/16/93

Title: (Letter responding to Mr. Gilbert's request regarding the potential routing and feasibility of the construction of a pipeline to the Delaware River)

Type: CORRESPONDENCE

Author: Molt, Stephen W.: NL Industries, Inc.
Recipient: Gilbert, Michael: US EPA

Doc ID# 54427

4/28/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 15

Document Number: NLI-002-2014 To 2060

Date: 12/01/90

Title: NL Industries, Sediment Analyses, Phase III Nov., Dec. 1990

Type: FINANCIAL/TECHNICAL

Author: none: Ebesco Services

none: O'Brien & Gere

Recipient: none: none

Doc ID# 54428

Document Number: NLI-002-2061 To 2073

Date: 01/01/91

Title: Oversight Steamy Report - NL Industries Site, Pedricktown, New Jersey

Type: REPORT

Condition: DRAFT; MARGINALIA

Author: Rubin, David B.: Ebesco Services

Recipient: none: US EPA

Doc ID# 54429

Document Number: NLI-002-2074 To 2077

Date: 06/20/91

Title: (Letter indicating that the inorganic analyses for groundwater have misreported units.)

Type: CORRESPONDENCE

Author: Hole, Frank D.: O'Brien & Gere

Recipient: Molt, Stephen W.: NL Industries, Inc.

Doc ID# 54430

Document Number: NLI-002-2078 To 2078

Date: 08/13/91

Title: (Letter forwarding the revised results of the Phase III oversight samples and indicating that the units on the groundwater analysis have been revised.)

Type: CORRESPONDENCE

Author: Gilbert, Michael R.: US EPA

Recipient: Molt, Stephen W.: NL Industries, Inc.

Attached: NLI-002-0364 NLI-002-0368

Doc ID# 54431

3/23/94

Index Document Number Order
NL INDUSTRIES, OPERABLE UNIT 1 Documents

Page: 16

Document Number: NLI-002-2079 To 2175

Date: 08/02/99

Title: Transcript of Proceedings - In the Matter of: Superfund Proposed Plan, IO. Industries, Inc.,
Pedricktown, N.J.

Type: LEGAL DOCUMENT

Author: Butler, Virginia E.: Accurate Court Reporting Services

Recipient: none: none

Doc ID# 54432

Document Number: NLI-002-2176 To 2200

Date: 02/02/94

Title: (Mass forwarding the attached project summary for the Acid Extraction Treatment System and
several sections from the final report detailing the Pedricktown soil)

Type: CORRESPONDENCE

Author: Paff, Stephen U.: Center for Hazardous Materials Research - (Univ. of Pittsburgh)

Recipient: Olibert, Mick: US EPA

Doc ID# 54433

**NL INDUSTRIES, INC.
OPERABLE UNIT ONE UPDATE
ADMINISTRATIVE RECORD FILE
INDEX OF DOCUMENTS**

RECORD OF DECISION

P. NLI 002 2201- Record of Decision, NL Industries Inc.,
NLI 002 2498 Pedricktown, Salem County, New Jersey, July
8, 1994.

Doc ID# 54434

**NL INDUSTRIES, INC.
OPERABLE UNIT ONE
ADMINISTRATIVE RECORD FILE UPDATE #2
INDEX OF DOCUMENTS**

5.0 RECORD OF DECISION

5.3 Explanations of Significant Differences

- P. 500001 - Report: Explanation of Significant Difference,
500007 NL Industries Superfund Site, Pedricktown, Salem
County, New Jersey, prepared by U.S. Environmental
Protection Agency, Region 2, June 21, 1999.

Doc. ID# 107786

NL INDUSTRIES, INC.
OPERABLE UNIT ONE
ADMINISTRATIVE RECORD FILE UPDATE #3
INDEX OF DOCUMENTS

5.0 RECORD OF DECISION

5.2 Amendment to the Record of Decision

- P. 500008 - Report: Focused Feasibility Study for Groundwater
500401 Remediation, NL Industries Superfund Site,
Pedricktown, New Jersey, prepared by CSI
Environmental LLC, prepared for Interim Pedrick
Doc. ID# 111372 Site Group, Original: November 2007, Revised:
September 2008, March 2009, February 2011, May
2011, and June 2011.
- P. 500402 - Report: Superfund Program Proposed Plan,
500413 NL Industries, Inc. Superfund Site, prepared by
U.S. Environmental Protection Agency, Region 2,
July 17, 2011.
Doc. ID# 111373

APPENDIX V – STATE LETTER OF CONCURRENCE



State of New Jersey

CHRIS CHRISTIE
Governor

DEPARTMENT OF ENVIRONMENTAL PROTECTION
Bureau of Case Management
401 East State Street
P.O. Box 420 Mail Code 401-05F
Trenton, NJ 08625-0028

BOB MARTIN
Commissioner

KIM GUADAGNO
Lt. Governor

Walter Mugdan, Director
Emergency and Response Division
U.S. Environmental Protection Agency
Region II
290 Broadway
New York City, New York 10007-1866

September 2, 2011

**RE: NL Industries Superfund Site
Record of Decision (ROD) Amendment Letter of Concurrence
Operable Unit 1 Amendment
Oldmans Township, Salem County
SRP PI# 025259**

Dear Mr. Mugdan:

The New Jersey Department of Environmental Protection (Department) has completed its review of the September 2011 Record of Decision (ROD) amendment for the Groundwater Remediation at the NL Industries Superfund Site, Oldmans Township, Salem County prepared by the U.S. Environmental Protection Agency (EPA) Region II. The Department concurs with the selected groundwater remedy for the site.

In 1994, U.S. Environmental Protection Agency selected extraction and treatment of groundwater in the Record of Decision for OU-1. The response action described in this ROD amendment addresses the change in the selected remedy from extraction and treatment of groundwater to in-situ groundwater remediation. The goal is to restore the groundwater to drinking water standards.

The major components of the selected groundwater remedy are as follows:

- Reagent injection
- Groundwater monitoring
- Institutional controls, including a classification exception area.

The Department appreciates the opportunity to participate in the decision making process to select an appropriate remedy for ground water at the NL Industries Site and is looking forward to future such cooperation with EPA during the remaining remedial work at this site.

Sincerely,

A handwritten signature in cursive script, reading "Leonard Romino".

Leonard Romino, Assistant Director
Responsible Party Remediation

cc: Honorable William Miller, Mayor, Oldmans Twp.
Melinda Taylor, Municipal Clerk, Oldmans Twp.
Theresa A. Hwilka, USEPA Region II

Appendix B: SOW

**Statement of Work
NL Industries, Inc. Superfund Site
Operable Unit 1 for Groundwater
Oldmans Township, Salem County, New Jersey**

I. INTRODUCTION

On July 8, 1994, The U.S. Environmental Protection Agency (EPA) issued a Record of Decision (ROD) for Operable Unit 1 (OU1) of the NL Industries, Inc. Superfund Site (1994 OU1 ROD) located in Pedricktown, New Jersey. The remedies selected in the 1994 OU1 ROD addressed soil, sediment and groundwater. In June 1996, a group of respondents, including the Respondents, signed a Consent Order with EPA, requiring the Respondents to design the remedy selected in the 1994 OU 1 ROD. On April 5, 1999, a Consent Decree (Civil Action No. 99-52) was entered (1999 CD), through which a group of respondents, including the Respondents, agreed to implement the remedies selected by EPA in the 1994 OU1 ROD.

Remedial actions are currently underway to address soil and sediment. Ongoing and future remedial activities related to the soil and sediment components of the 1994 OU1 ROD will be conducted in accordance with the 1994 OU 1 ROD, the 1999 Consent Decree, and the 1999 Statement of Work (1999 SOW).

Subsequent to the issuance of the 1999 CD, additional groundwater studies were performed by the Respondents, with EPA oversight. Based on these studies and the development of a Focused Feasibility Study by Respondents, EPA determined that it was appropriate to amend the remedy selected in the 1994 OU1 ROD for groundwater. The selected remedy for soil and sediment was not modified. On September 13, 2011, EPA issued the OU1 ROD Amendment, which modified the selected remedy in the 1994 OU1 ROD for groundwater. This SOW addresses the remedial design of the Selected Remedy for groundwater in the September 2011 OU1 ROD Amendment (Reagent Injection Plus Institutional Controls). The Remedial Design for the Selected Remedy for groundwater will be conducted in accordance with the 2011 OU1 ROD Amendment, the Administrative Order (U.S.EPA Index No. CERCLA-02-2012-2028) and this Statement of Work (SOW). The 2011 OU1 ROD Amendment provides that the groundwater remedy selected in the 1994 OU1 ROD (pump and treat) will be retained as a contingency remedy. This SOW does not address remedial design for the contingent pump and treat remedy.

II. WORK TO BE PERFORMED

The objectives of the work (hereinafter "Work," as defined in Section X of the Administrative Order for performance of OU1 Remedial Design activities for the NL

Industries, Inc. Superfund Site to which this SOW is attached) to be conducted at the Site, relate to contaminated groundwater. The objectives of the Work related to groundwater contamination shall be met through the implementation of the OUI ROD Amendment issued by EPA on September 13, 2011, and attached as Appendix A to the Administrative Order. The Respondents shall finance and perform the Work in accordance with the Administrative Order and this SOW, including all terms, conditions and schedules set forth therein or developed and approved there under.

The objectives of this SOW are applicable only to the implementation of the OUI groundwater remedy design consistent with the OUI ROD Amendment and are:

- To restore the contaminated unconfined aquifer to drinking water standards for all contaminants;
- Minimize the potential for migration of the contaminants of concern in groundwater; and
- Prevent or minimize potential current and future human exposures; including ingestion of groundwater, that presents a significant risk to public health and the environment.

The Work related to contaminated groundwater will consist of design of the remedy selected in the OUI ROD Amendment. The major components of the Selected Remedy are as follows:

- In-situ pH adjustment and reagent injection for the contaminated unconfined aquifer via injection wells;
- Monitoring of groundwater; and
- Implementation of institutional controls to restrict the use of contaminated groundwater until cleanup goals are achieved.

III. PERFORMANCE STANDARDS

Performance Standards are the cleanup standards and other measures of achievement which are required to be met in order to achieve the cleanup goals and other objectives of the Remedial Action selected in the OUI ROD Amendment.

The Remedial Design (RD) shall be developed to achieve compliance with the Performance Standards set forth in the Remedial Action Objectives section of the OUI ROD Amendment. The groundwater remedy shall also be designed to achieve compliance with all legally applicable and relevant and appropriate requirements (ARARs) as set forth in the OUI ROD Amendment.

IV. PROJECT SUPERVISION/MANAGEMENT

A. Supervising Contractor

All aspects of the Work to be performed by the Respondents pursuant to the Administrative Order shall meet all requirements of applicable federal, state and local laws and be performed under the direction and supervision of a Supervising Contractor, the selection of which shall be subject to review and approval by EPA. The Supervising Contractor shall be a qualified licensed professional engineering firm. All plans and specifications shall be prepared under the supervision of, and signed/certified by, a licensed New Jersey professional engineer. Within ten (10) calendar days (hereinafter "Days" as defined in the Administrative Order) after the Effective Date of the Administrative Order, the Respondents shall submit to EPA a proposed Supervising Contractor, including the proposed Supervising Contractor's qualifications. Respondents shall demonstrate that the proposed contractor has a Quality System that complies with the Uniform Federal Policy for Implementing Quality Systems (UFP-QS), (EPA/505/F-03/001, March 2005), by submitting a copy of the proposed contractor's Quality Management Plan ("QMP"). EPA will provide written notice if it disapproves of the proposed Supervising Contractor and request that the Respondents propose another Supervising Contractor. Respondents shall notify EPA of the name of the next proposed Supervising Contractor within thirty (30) days of EPA's request. If at any time thereafter, Respondents propose to change a Supervising Contractor, Respondents shall give such notice to EPA and must obtain an authorization to proceed from EPA before the new Supervising Contractor performs, directs, or supervises any Work under the Administrative Order.

B. Project Coordinator

Within ten (10) Days of the Effective Date of the Administrative Order, Respondents shall notify EPA, in writing, of the name and title of the proposed Project Coordinator, and alternate Project Coordinator, who may be employees of the Supervising Contractor. The Project Coordinator shall be responsible for the day-to-day management of all Work to be performed pursuant to the Administrative Order. The Project Coordinator shall have adequate technical and managerial experience to manage all Work described in this SOW and under the Administrative Order. The Project Coordinator shall be knowledgeable at all times about all Work. The Project Coordinator shall be the primary contact for EPA on all matters relating to the Work at the Site and should be available for EPA to contact during all working days. The Project Coordinator shall not be an attorney.

V. PROGRESS REPORTS AND CONSTRUCTION MEETINGS

A. Monthly Progress Reports

In addition to the other deliverables set forth in the Administrative Order, Respondents shall provide monthly progress reports to EPA with respect to actions and activities undertaken pursuant to the Administrative Order. The progress reports shall be submitted on or before the 15th day of each month following the effective date of the Administrative Order. Respondents' obligation to submit progress reports continues until EPA gives the Respondents written notice under Section XXVII of the Administrative Order. At a minimum, these progress reports shall include the following:

1. A description of all actions which have been taken toward achieving compliance with the Administrative Order during the prior month;
2. A description of any violations of the Administrative Order and other problems encountered during the prior month;
3. A description of all corrective actions taken in response to any violations or problems which occurred during the prior month;
4. The results of all sampling, test results and other data received or generated by the Respondents during the course of implementing the Work during the prior month. Such results shall be validated in accordance with the approved Quality Assurance Project Plan developed in conformity with the SOW. The monthly report shall also identify all plans, reports, and other deliverables required by the Administrative Order completed and submitted during the previous month;
5. A description of any modifications to the work plans or other schedules that the Respondents have proposed to EPA or that have been approved by EPA, and a description of all plans, actions, and data scheduled for the next eight weeks. The monthly report shall also include a description of all activities undertaken in support of community relations during the previous month and those to be undertaken in the next eight weeks;
6. An estimate of the percentage of the Work required by the Administrative Order which has been completed as of the date of the progress report; and

7. An identification of all delays encountered or anticipated that may affect the future schedule for performance of the Work, and all efforts made by the Respondents to mitigate delays or anticipated delays.

VI. REMEDIAL DESIGN ACTIVITIES

The remedial design (RD) activities to be performed in support of the implementation of the Work include, but are not limited to, the following:

- A. Development of work plans, tasks, and schedules for: Pre-RD Investigations, including a Pilot Study; Preliminary RD Report (35% completion) which shall include the findings of the Pre-RD investigations and pilot study; Pre-Final RD Report (95% completion); and a Final RD Report (100% completion) (collectively, RD Reports);
- B. Performance of data collection, including groundwater sampling and analysis necessary to design the pH adjustment and reagent injection system, and evaluate the current extent of groundwater contamination;
- C. Performance of a pilot study for the implementation of the groundwater Selected Remedy;
- D. Design of a network of wells and prepare detailed specifications for the implementation of the groundwater Selected Remedy as outlined in the OUI ROD Amendment;
- E. Evaluation of the need for air monitoring during construction activities at the Site and development, if necessary, of plans to ensure that air emissions resulting from construction activities meet applicable or relevant and appropriate air emission requirements;
- F. Tasks required for establishing institutional controls, such as the implementation of a Classification Exemption Area (CEA) to restrict the use of groundwater until the appropriate groundwater cleanup standards are achieved;
- G. Tasks to conduct an analysis to ensure that any adverse impacts caused by the RA to the streams, surface water bodies and wetland areas will be mitigated; and
- H. Tasks to identify how the RD and the RA will be implemented using the principles specified in EPA Region 2's Clean and Green Policy.

VII REMEDIAL DESIGN WORK PLAN

Within sixty (60) days from the date of EPA's approval of the Supervising Contractor, the Respondents shall submit a draft Remedial Design Work Plan to EPA for review and approval pursuant to Section X (Work to be Performed) of the Administrative Order.

The draft RD Work Plan shall be prepared in accordance with the OUI ROD Amendment, this SOW, the Administrative Order, CERCLA and relevant EPA guidance, including EPA document entitled Guidance on Oversight of Remedial Designs and Remedial Actions performed by Potentially Responsible Parties, (OSWER directive 9355.5-01, EPA/540/g-90-001), dated April 1990, and shall be in conformance, inter alia, with the Superfund Remedial Design and Remedial Action Guidance, dated June 1986, and any updates thereto.

The draft RD Work Plan shall include tasks, work plans, field work and data collection, and schedules for implementation of the RD, that are necessary to ensure compliance with performance standards, ARARs, or other requirements of the remedy selected in the OUI ROD Amendment, including the preparation and submission of: a Preliminary RD Report (35% completion) which shall include the findings of the Pre-RD Investigations and the pilot study); a Pre-Final RD Report (95% completion); and a Final RD Report (100% completion) (collectively, RD Reports). The draft Remedial Design Work Plan shall also include a draft schedule for remedial action, O&M, and monitoring activities. The schedule shall be in the form of a task/subtask activity bar chart or critical path method sequence of events. The RD Work Plan shall also include a description of how the RD will incorporate the principles found in EPA Region 2's Clean and Green Policy. At a minimum, the draft Remedial Design Work Plan shall include, but not be limited to, the following:

- A. A description of all RD Tasks.
- B. A detailed schedule for all RD activities which shall be in the form of a task/subtask activity bar chart or critical path method sequence of events.
- C. A Field Sampling and Analysis Plan (FSP) which provides for the collection of all data and work necessary to complete RD field activities such as, but not limited to: the collection of hydrogeologic data, groundwater flow data, residential sampling data; and other sampling and analysis data to determine the current extent of groundwater contamination both laterally and vertically.
- D. A Pilot Study Work Plan shall be prepared by the Respondents and shall provide for, but not be limited to, the determination of the chemicals to be used for pH adjustment and reagent injection, the delivery system for the chemicals, and the determination of the number and placement of injection wells and monitoring wells needed to implement the selected remedy.

- E. A plan for establishing institutional controls, such as the implementation of a CEA to restrict the use of groundwater impacted by the Site until the appropriate groundwater cleanup standards are achieved.
- F. A plan for the performance of air monitoring, as necessary, during construction activities at the Site to ensure that air emissions resulting from the construction activities meet applicable or relevant and appropriate air emission requirements.
- G. A description of how the RD will incorporate the principles found in EPA Region 2's Clean and Green Policy.
- H. Quality Assurance/Quality Control Project Plan (QAPP). The QAPP may be an amended version of a previously submitted QAPP, however, it must meet all of the following requirements:
 - 1. The QAPP shall be consistent with the Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP), Parts 1, 2 and 3, EPA-505-B-04-900A, B and C, March 2005 or newer, and other guidance documents referenced in the aforementioned guidance documents. Activities involving the collection, generation, use and/or reporting of environmental data; design, construction and/or operation of environmental technologies; development and/or use of models; and other activities that need quality assurance or quality control requirements shall incorporate quality assurance, quality control, and chain of custody procedures in accordance with the Uniform Federal Policy for Implementing Quality Systems (UFP-QS), EPA-505-F-03-001, March 2005 or newer, Uniform Federal Policy for Quality Assurance Project Plans (UFP-QAPP), Parts 1, 2 and 3, EPA-505-B-04-900A, B and C, March 2005 or newer, and other guidance documents referenced in the aforementioned guidance documents. The UFP documents may be found at:
<http://www.epa.gov/fedfac/documents/intergovqualtaskforce.htm>.
 - 2. In addition to the above, guidance and procedures that are located in the EPA Region 2 DESA/HWSB website:
<http://www.epa.gov/region02/qa/documents.htm>, as well as other OSWER directives and EPA Region 2 policies should be followed, as appropriate. Subsequent amendments to the above, upon notification by EPA to the Respondents of such amendments, shall apply only to procedures conducted after such notification.
 - 3. The Respondents will provide electronic submittals of sampling data in accordance with Region 2 policies, guidelines, and formats. The Region 2 Electronic Data Deliverable (EDD) is a standardized

format for all electronic submittals. Electronic submittals of sampling data will be made in accordance with the project schedule and in conjunction with the submittal of draft reports. The Respondents are responsible for reviewing and approving any contractor work for consistency with Region 2 EDD requirements. The Region 2 EDD Guidance and Requirements include instruction manuals and data submission and validation files.

The most recent EDD Guidance and Requirements can be found at: <http://www.epa.gov/region02/superfund/medd.htm>.

Environmental data, as referred to above, are defined as any measurements or information that describe environmental processes, location, or conditions; ecological or health effects and consequences; or the performance of environmental technology. For EPA, environmental data include information collected directly from measurements, produced from models, and compiled from other sources such as databases or the literature.

4. The QAPP shall also specifically include the following items:
 - a) An explanation of the way(s) the sampling, analysis, testing, and monitoring will produce data for the RD phase of the Work;
 - b) A detailed description of the sampling, analysis, and testing to be performed, including sampling methods, analytical and testing methods, sampling locations and frequency of sampling; and
 - c) A map depicting sampling locations (to the extent that these can be defined when the QAPP is prepared).
5. In order to provide quality assurance and maintain quality control with respect to all samples to be collected, Respondents shall ensure the following:
 - a) Quality assurance and chain-of-custody procedures shall be performed in accordance with standard EPA protocol and guidance, including the guidance provided in the EPA Region 2 Quality Assurance Homepage, and the guidelines set forth in the Administrative Order.
 - b) Once laboratories have been chosen, each laboratory's quality assurance plan (LQAP) should be submitted to EPA for review. In addition, the laboratory or the Respondents shall submit to EPA current copies (within the past six

months) of laboratory certification provided from either a State or Federal Agency which conducts certification. The certification should be applicable to the matrix/analyses which are to be conducted. If the laboratory does not participate in the Contract Laboratory Program (CLP), they must submit to EPA the results of performance evaluation (PE) samples for the constituents of concern from within the past six months or they must complete PEs for the matrices and analyses to be conducted and results must be submitted with the LQAP.

- c) For any analytical work performed, including that done in a fixed laboratory, in a mobile laboratory, or in on-Site screening analyses, Respondents must submit to EPA a "Non-CLP Superfund Analytical Services Tracking System" form for each laboratory used during a sampling event, within thirty (30) days after acceptance of the analytical results. Upon completion, such documents shall be submitted to the EPA Remedial Project Manager, with a copy of the form and transmittal letter to:

Regional Sample Control Center Coordinator
U.S. EPA Region 2
Division of Environmental Science & Assessment
2890 Woodbridge Avenue, Bldg. 209, MS-215
Edison, NJ 08837

- d) The laboratory used for analyses of samples must perform all analyses according to accepted EPA methods.
- e) Unless indicated otherwise in the approved QAPP, or approved by EPA, Respondents will validate 100% of the data.
- f) Submission of the validation package (checklist, report and Form 15 containing the final data) to EPA, to the extent applicable, prepared in accordance with the provisions of Subparagraph h, below.
- g) Assurance that all analytical data that are validated as required by the QAPP are validated according to the latest version of EPA Region 2 data validation Standard Operating Procedures. Region 2 Standard Operating Procedures are available at:
<http://www.epa.gov/region02/qa/documents.htm>

- h) Unless indicated otherwise in the QAPP, Respondents shall require deliverables equivalent to CLP data packages from the laboratory for analytical data. Upon EPA's request, Respondents shall submit to EPA the full documentation (including raw data) for this analytical data. EPA reserves the right to perform an independent data validation, data validation check, or qualification check on generated data.
- i) Respondents or the Supervising Contractor shall insert a provision in their contract(s) with the laboratory used for analyses of samples, which will require granting access to EPA personnel and authorized representatives of EPA for the purpose of ensuring the accuracy of laboratory results related to the Site.
- j) Document Field Activities - The Respondents shall consistently document the quality and validity of field and laboratory data compiled during the Work.

Information gathered under this Administrative Order will be consistently documented and adequately recorded by the Respondents in well maintained field logs and laboratory reports. The method(s) of documentation must be specified in the RD Work Plan and QAPP. Field logs or dedicated field log-books must be used to document observations, measurements, and significant events that have occurred during field activities. Electronic field record keeping can be used; however, it does not eliminate the requirement for manual record keeping and/or submittals. Measurements or observations may also be recorded by appropriate electronic media and transferred into the report from these media. Laboratory reports must document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies.

- k) Maintain Sample Management and Tracking.

The Respondents shall maintain field reports, sample shipment records, analytical results, and QA/QC reports. In addition, the Respondents shall safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

6. In the event that additional sampling locations, testing, and analyses are required, Respondents shall submit to EPA an addendum to the QAPP for approval by EPA.

I. Health and Safety Plan

The Health and Safety Plan (HASP) for all activities performed under the Administrative Order shall be developed by Respondents to address the protection of public health and safety and the response to contingencies that could impact public health, safety, and the environment. The HASP shall satisfy the requirements of the Occupational Safety and Health Guidance for Hazardous Waste Site Activities, (June 1990, DHHS NIOSH Publication No. 90-117), and the Occupational Safety and Health Administration, U.S. Department of Labor (OSHA) requirements cited below:

1. All activities performed by or on behalf of Respondents shall be performed in such a manner as to ensure the safety and health of personnel so engaged. Activities shall be conducted in accordance with all pertinent general industry (29 CFR Part 1910) and construction (29 CFR Part 1926) OSHA standards, and EPA's Standards Operating Safety Guides (OSWER, 1988), as well as any other applicable State and municipal codes or ordinances. All RD/RA/O&M activities performed by Respondents, their contractors or subcontractors, shall comply with those requirements set forth in OSHA's final rule entitled Hazardous Waste Operations and Emergency Response, 29 CFR '1910.120, Subpart H.
2. The HASP shall include, at a minimum, the following items:
 - a) Plans showing the location and layout of any temporary facilities to be constructed;
 - b) Description of the known hazards and evaluation of the risks associated with the area of contaminated groundwater and related potential health impacts;
 - c) List of key personnel and alternates responsible for safety, response operations, and protection of the public;
 - d) Description of levels of protection (based on specified standards) to be used by all personnel;
 - e) Delineation of work, decontamination, and safe zones, and definitions of the movement of zones;

- f) Description of decontamination procedures for personnel and equipment, and handling and removal of disposable clothing or equipment;
- g) Incidental emergency procedures which address emergency care for personnel injuries and exposure problems, and containment measures. These procedures shall include evacuation routes, internal and external communications procedures for response to fire, explosion, or other emergencies, the name of the nearest hospital and the route to that hospital. Local agencies with the capability to respond to emergencies shall be identified and their capabilities shall be described. A description of the procedures for informing the local agencies of these measures shall be outlined;
- h) Description of the personnel medical surveillance program in effect;
- i) Description of monitoring for personnel safety;
- j) Description of routine and special personnel training programs; and
- k) Description of an air monitoring program, if required, to determine concentrations of airborne contaminants to which workers or others may be exposed. The results of work-zone air monitoring may be used as a trigger for implementing air monitoring.

J. A plan to ensure that any adverse impacts caused by the Work to streams, surface water bodies and wetland areas will be mitigated.

K. Access and Other Approvals

The draft RD Work Plan shall include descriptions of known access and other approvals and institutional controls which Respondents will need in order to comply with the Administrative Order, with the exception of those approvals needed from EPA. This description shall detail how such access and other approvals will be sought, and shall include a schedule for obtaining all necessary access and other approvals including, but not limited to, approval from any off-Site facility accepting waste materials shipped by or on behalf of Respondents. This description shall be updated as appropriate, if subsequent approvals are required.

L. Institutional Controls

The draft RD Work Plan shall include a description of appropriate institutional controls, such as the implementation of a CEA, to restrict the use of groundwater until the unconfined aquifer is restored to the cleanup standards described in the OUI ROD Amendment. The Respondents shall utilize their best efforts to secure the appropriate institutional controls. Institutional controls may include such controls as deed restrictions, groundwater well use restrictions, and the implementation of a CEA. The restrictions shall be maintained until EPA notifies the Respondents that EPA has determined, after a reasonable opportunity for review and comment by the State of New Jersey, that the restrictions may be lifted without posing a threat to human health and the environment.

VIII. APPROVAL OF REMEDIAL DESIGN WORK PLAN

EPA will either approve the draft RD Work Plan or require modifications as per the Administrative Order. Respondents shall make the modifications required by EPA in accordance with the procedures set forth in Section XIII of the Administrative Order. Following EPA approval, the draft RD Work Plan shall become the RD Work Plan and shall be incorporated into and become an enforceable part of the Administrative Order.

IX. REMEDIAL DESIGN

- A. Respondents shall perform the RD activities in conformance with the RD Work Plan approved by EPA and within the time frames specified in the RD schedule contained therein.

In accordance with the schedule set forth in the EPA-approved RD Work Plan, the Respondents shall submit the findings of the Pre-RD Investigations within the Preliminary RD Report. This will include the results and analysis of all data collected during the Pre-RD field studies, as well as the significant findings and recommendations of the Pilot Study.

- B. The RD Reports shall be submitted to EPA and the New Jersey Department of Environmental Protection in accordance with the schedule set forth in the EPA-approved RD Work Plan. Each RD Report shall include a discussion of the design criteria and objectives, with emphasis on the capacity and ability to meet design objectives successfully. Each report shall also include the plans and specifications that have been developed at that point in time, along with a design analysis. The design analysis shall provide the rationale for the plans and specifications, including results of relevant sampling and testing performed, supporting calculations and documentation of how these plans and specifications will

meet the requirements of the OUI ROD Amendment and shall provide a discussion of any impacts these findings may have on the RD. In addition to the above, the RD Reports shall include the following items:

1. Specifications for photographic documentation of the remedial construction work;
2. A discussion of the manner in which the RA will achieve the Performance Standards;
3. A discussion of the manner in which the RA will comply with EPA Region 2's Clean and Green Policy;
4. A description of the status of implementation of institutional controls such as deed restrictions and groundwater well use restrictions, and the implementation of a CEA to further restrict the use of groundwater associated with the Site until the aquifer is restored to the appropriate standards;
5. A draft schedule for RA activities, and a preliminary schedule for O&M activities, including a long-term sampling program;
6. The draft schedule for the RA shall provide for the completion of the installation of the remedy within 12 months of EPA's approval of the RAWP. The draft schedule for RA and monitoring activities may be revised during the remedial process, subject to EPA's approval;
7. A Construction Quality Assurance Project Plan (CQAPP), which shall detail the approach to quality assurance during construction activities at the Site;
8. A report describing those efforts made to secure access and obtain other approvals and the results of those efforts. Legal descriptions of property or easements to be acquired, if necessary, shall be provided; and
9. A plan for implementation of construction and construction oversight.

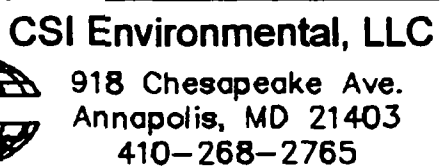
X. APPROVAL OF RD REPORTS

- A. EPA will review and comment on the Preliminary RD Report (35% completion), and the Pre-Final RD Report (95% completion). Respondents shall address EPA's comments on each RD Report in the

subsequent RD Report (e.g. changes required by comments on the Preliminary RD Report (35% completion) shall be made in the Pre-Final RD Report (95% completion).

- B. Respondents shall submit the Final RD Report (100% completion) to EPA for review and approval pursuant to Section XIII (EPA Review of Submissions) of the Administrative Order. Once approved by EPA, the Final RD Report (100% completion) shall be incorporated into and become an enforceable part of the Administrative Order.

Appendix C: Map of Site



**NL Industries Superfund Site
Pedricktown, New Jersey**

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